CPAN Workshop on Technology Transfer

Report of Contributions

https://indico.ific.uv.es/e/744

Contribution ID : **1** Type : **not specified**

Adding value to medical devices

Monday, 24 June 2013 13:00 (15)

Work with product in mind is not a goal in research, but Medical devices are exposed to regulations, and regulations contain strategic information to focus research to end user products.
Also the regulations can provide a value add to research providing mechanisms to improve the quality, objectives and also reproducibility of the results.

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. KIKO, Albiol (IFIC-UV)

Presenter(s) : Dr. KIKO, Albiol (IFIC-UV)

Contribution ID : **2** Type : **not specified**

Instrumentation RD and technology transfer of the HEP experimental group of the ICC-UB

Monday, 24 June 2013 17:30 (15)

The High Energy Physics Group (HEPG), from the Institute of Cosmos Sciences and the Department of Structure and Constituents of Matter holds expertise in the design and testing of low noise and high speed acquisition systems for scientific instrumentation and medical imaging, as well as for satellite and space missions instrumentation. The group has more than ten years of experience in the design of radiation-tolerant Application-Specific Integrated Circuits (ASICs) that have been used on a large scale at large international scientific facilities like CERN. Recerntly, several technology transfer projects with industry have started. We will present the knowledge and resources of the group and discuss present and possible collaborations with industry.

Summary

Oral or poster presentation

Primary author(s) : Dr. GASCON, David (ICC - Universitat de Barcelona)

Presenter(s) : Dr. GASCON, David (ICC - Universitat de Barcelona)

Contribution ID : **3** Type : **not specified**

Tharsis Technology overview

Tuesday, 25 June 2013 10:15 (15)

Tharsis Technology is a R&D company specialized in mechanical designs and advanced electronic for Nuclear and Particle Physics instruments, data acquisition and control systems providing high performance solutions.

Technology Consulting Services.
Ultra High Vacuum Systems.
Radiation Detectors.
Beam Diagnostic Systems.
Advanced Electronic Systems.
Electronic Repairs.
Training.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. BERJILLOS, RAFAEL (Tharsis Technology S.L.)

Presenter(s) : Mr. BERJILLOS, RAFAEL (Tharsis Technology S.L.)

Contribution ID : **4** Type : **not specified**

Seven Solutions as an Industry for Science reliable partner: Development, design, manufacturing, test and support.

Tuesday, 25 June 2013 12:30 (15)

Seven Solutions as an Industry for Science reliable partner: Development, design, manufacturing, test and support.
Seven Solutions has been working in the last years for different scientific facilities and institutions, for instance through CERN, for different particle accelerator electronics (timing and control), through GSI for FAIR and through IAA for different aerospace projects. We have collaborated in developing and customizing different electronics, gateware (for FPGA based platforms) and low level software, for different labs for specific purpose applications. We have also collaborated in the development of a cutting edge timing technology (White Rabbit, http://www.sevensols.com/whiterabbitsolution/) which allows subnanosecond reliable synchronization at a network of up to 2000 nodes and 10 Kms distances. It allows fine synchronization, deterministic and reliable communication (with well defined maximum latency which is important for control distributed instrumentation facilities). This technology was successfully used in the final Neutrinos experiments (between Gran Sasso and CERN) and is now being considered in other international projects and facilities (such as FAIR at GSI).
The different collaborations in which we have participated have been articulated through research projects in which we have been integrated as an industrial partner (subcontracted or partner of the consortium), direct subcontracts for specific purpose developments or through acquisition of specific purpose electronics that have been designed by the company to match specific requirements of research projects.
There are also different instrumentation teams at research facilities that develop their own electronics, but making them available to wider communities (also scientific communities at other institutions) and providing appropriate support is beyond their capabilities or natural competences. Technology based SMEs, such as Seven Solutions can also play here the “spread out” role, provided that the source institution supports the first standardization and manufacturing efforts. We have also long expertise in open hardware, and can thus also facilitate the transfer of electronic designs into the open hardware community aiming a more efficient use of the design efforts.
Industry for Science is a small, but very innovative market, in which technology based companies such as Seven Solutions may collaborate at different stages of different instrumentation developments, and evaluate long term transfer to wider industrial markets. Around large scale scientific facilities such as CERN or GSI, collaborate technology based SMEs, for specific purpose developments. Mutual understanding between scientific teams/institutions and technology based companies is crucial for efficient collaborations. Furthermore, when a technology based company becomes part of the project and participates even at the development stages, this may facilitate the use of the same or similar technologies beyond the original source. It facilities technology transfer and the SME assumes specific roles (such as manufacturing and support) that are more natural to companies than research institutions.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. JAVIER, Díaz Alonso (Seven Solutions S.L); Mr. EDUARDO, Ros Vidal (Seven Solutions S.L)

Presenter(s) : Mr. JAVIER, Díaz Alonso (Seven Solutions S.L)

Contribution ID : **5** Type : **not specified**

Medidas de Radón Ambiental

Monday, 24 June 2013 11:00 (15)

I. Introducción
El radón liberado por la series radiactivas naturales de torio y uranio es una de las fuentes de exposición radiactiva de la población más importantes. Desde los años 70 se ha acumulado una cantidad considerable de medidas de actividades dosis radiactivas procedentes del radón, obteniendo como conclusión que las distribuciones estadísticas de dichas medidas satisfacen una ley log-normal, que implica una probabilidad importante de recibir dosis muy elevadas, aunque la dosis media sea moderada. Los tres isótopos radiactivos liberados por las cadenas de torio y uranio son el 222Rn en la serie de 238U, el 220Rn en la serie del 232Th y el el 219Rn en la serie de 235U. A estos dos últimos isótopos se les denomina torón y actinón respectivamente. El 222Rn tiene un tiempo de semivida de T1/2 = 3,82 días mientras que el 219Rn tiene una semivida de T1/2 = 3,96 s y el 220Rn tiene una semivida de T1/2 = 55,6 s. Las cortas vidas medias del torón y del actinón tienen como consecuencia que su concentración en aire sean muy bajas, y se desintegren antes de atravesar las rocas en las que se producen, siendo despreciable a dosis radiactiva debida a estos isótopos. Sin embargo el 222Rn, debido a si tiempo de vida más elevado puede alcanzar concentraciones importantes en el aire y al ser inhalado queda atrapado en el cuerpo humano en el que se desintegra α, produciendo isótopos radiactivos de polonio, plomo y bismuto hasta llegar al 206Pb, estable. En lugares cerrados las concentraciones de radón en el aire pueden alcanzar valores de varios miles de Bq/m3, que corresponde a dosis de decenas de mSv al año, por lo que constituye un factor de exposición radiactiva importante que entraña riesgos asociados. Para exposición a largo término a concentraciones superiores a 200 Bq/cm3 existen evidencias de riesgos de cáncer de pulmón. Por ello es necesario monitorizar la concentración de Rn en lugares cerrados, tales como cuevas, sótanos, bodegas a fin de evaluar los riesgos radiactivos y tomar las medidas pertinentes.
II. Obligación legal de monitorizar el radón
El Real Decreto 1439/2010 obliga a los titulares de actividades laborales en las que existan fuentes de radiación que incluyen los siguientes lugares de trabajo:

1)Establecimientos termales.
2)Cuevas, galerías y minas.
3) Instalaciones donde se almacenan y tratan aguas de origen subterráneo.
4) Lugares de trabajo subterráneos en general.
5) Lugares de trabajo en zonas conocidas por sus valores elevados de radón.

III-Servicios prestados por el Laboratorio de Radiactividad Am- biental de la Universidad de Valencia

El Laboratorio de Radiactividad Ambiental de la Universidad de Valencia posee una amplia experiencia en la realización de las medidas cumpliendo con los procedimientos establecidos por el Consejo de Seguridad Nuclear (CSN) en la instrucción IS-33 del 21 de Diciembre de 2011. Posee un amplio equipamiento de detectores pasivos de trazas (LR-115 de ALGADE y CR-39 de Lan- dauer) y carbón activo empleados para medidas de larga y media duración, y electrónicos que proporcionan medidas inmediatas.
Junto con las medidas realizadas se suministra el informe que debe presentarse ante los órganos competentes.

iV. Experiencia adquirida
El laboratorio ha realizado numerosas medidas entre las que cabe destacar las realizadas para las centrales hidroeléctricas de IBERDROLA de La Muela, Aldeávila y Vilarino de Conso, numerosos centros públicos de la Comunidad Valenciana, dependencias del metro en Madrid y Valencia, cuevas como la de José de Vall de Uixó y estaciones de tratamiento de aguas residuales.

Summary

Oral or poster presentation

Oral

Primary author(s) : Prof. ROLDÁN, Clodoaldo (Departamento de Física Aplicada de la Universidad de Valencia); Prof. DIAZ, Jose (IFIC); Prof. FERRERO, Jose Lorenzo (Departamento de Física Atómica Molecular de la Universidad de Valencia y Nuclear); Ms. DELGADO, Vanesa (Departamento de Física Atómica Molecular y Nuclear de la Universidad de Valencia)

Presenter(s) : Prof. DIAZ, Jose (IFIC)

Contribution ID : **6** Type : **not specified**

Technology transfer activities of the Nuclear Physics Group of Complutense University

Tuesday, 25 June 2013 12:00 (15)

The nuclear physics group at Complutense University (GFN-UCM) deals with all aspects of nuclear physics, including technology transfer. The state of the art knowledge in detectors, electronicas and software to handle nuclear-radiation interaction that the group has mastered over many years of participation on nuclear physics experiments along the world, is being translated, since 2004, into practical applications, devices and technologies, marketed by leading Spanish compabies. Two main areas are subject to our technology transfer. In one side Nuclear Imaging, with emphasis in pre-clinical positron imaging technology. Our group has a long standing collaboration with SEDECAL and Hospital Gregorio Marañón, who led to image reconstruction software developed at GFN-UCM to be used in more than 40 reasearch scanners along the world, located in front-line research laboratories. In the other hand, we develop MC models and MC algorithms for dose planning in radiotherapy. Our knowledge is being transfer into radiance(R), the first tool available for intra-operatory radiotherapy planning. radiance(R) is being developed by the company GMV Aerospace. The technology transfer activitis of the GFN-UCM have been funded by the gouverment of Spain, under two consecutive CENIT projects (CDTEAM and AMIT), Singular and Strategic Projects (PSE) ENTEPRASE and INNPACTO Projects PRECISION and XIORT.

Summary

Oral or poster presentation

Oral

Primary author(s) : UDIAS, Jose (Universidad Complutense de Madrid)

Presenter(s) : UDIAS, Jose (Universidad Complutense de Madrid)

Contribution ID : **7** Type : **not specified**

COLABORACION CNA ENRESA

Monday, 24 June 2013 11:15 (15)

Colaboración enmarcada en el convenio firmado entre la Universidad de Sevilla y ENRESA en 2008, en el que se especifica la necesidad del estudio y control de isótopos radiactivos relacionados con los residuos de centrales nucleares.
Los científicos de la Universidad de Sevilla en el CNA, han dirigido las investigaciones fundamentalmente hacia la caracterización de residuos radiactivos de baja y media actividad, en la detección de radionúclidos de periodo de semidesintegración grande muy difíciles de detectar mediante las técnicas de recuento habituales. Adicionalmente, se han aplicado las técnicas IBA a la determinación de la composición química de este tipo de muestras.
Los proyectos llevados a cabo hasta ahora han abordado las siguientes actividades:
Desarrollo de la metodología y determinación de I-129 en muestras de residuos de centrales nucleares en operación (Resinas, Concentrados de evaporador, lodos húmedos y lodos desecados).
Desarrollo de la metodología y determinación de I-129 en materiales procedentes del desmantelamiento de la Central Nuclear de José Cabrera (hormigones y frotis fundamentalmente).
Desarrollo de la metodología y determinación por separado de Pu-239-Pu-240 en muestras de centrales nucleares.
Desarrollo de la metodología para la determinación de Cl-36 en grafito de Vandellós 1 y en muestras de hormigón de la central nuclear de José Cabrera.
Desarrollo de la metodología para la determinación de Am-243 en muestras de centrales nucleares.
Desarrollo de la metodología para la determinación de U-234, U-235, U-236 y U 238 en muestras de centrales nucleares.
Desarrollo de la metodología para la determinación de Ca-41 en muestras de centrales nucleares.
Determinación de la composición elemental del grafito virgen de Vandellós 1.
Determinación de la composición elemental de aceros no irradiados de las cámaras de fisión de la central nuclear de José Cabrera.
Determinación de la Composición elemental de los hormigones de la central nuclear de José Cabrera.

Summary

Oral or poster presentation

oral

Primary author(s) : Mr. LEGANES NIETO, JOSELUIS (ENRESA); Mr. ORDOÑEZ ALVAREZ, MANUEL (ENRESA)

Presenter(s) : Mr. LEGANES NIETO, JOSELUIS (ENRESA)

Contribution ID : **8** Type : **not specified**

TTI activities for particle accelerators

Tuesday, 25 June 2013 11:30 (15)

TTI is a private company founded in 1996 with years of experience in telecommunication and satellite industry. Since few years is expanding its market including large research facility and particle accelerator. TTI activities for particle accelerators concern two main business units: Solid State Power Amplifier and Accelerator concepts (RF cavity and cryogenics).

 Solid State Power Amplifier:

TTI has developed an original design of solid state power amplifier capable to provide in a very compact topology up to 30 kW (CW or pulsed operation) for a wide range of frequency bands (60-600 MHz). It includes water cooling, RF control unit based on PLC, LLRF and mechanical supports.

 Accelerator concepts:

TTI is involved in the conceptual design of particle accelerator for industrial purposes (proton cyclotron and electron linacs).

Superconducting RF cavities: TTI is developing RF coaxial cavities (QWR and HWR) at cryogenic temperatures for heavy ion and proton accelerator. It counts with the help and experience of world wide recognized particle accelerator laboratories.

Normal conducting RF cavities: TTI has developed and successfully commissioned normal conducting RF cavities to be used for high power coupler conditioning in ultra high vacuum conditions.

Summary

Oral or poster presentation

Oral and poster

Primary author(s) : Mr. PEREZ, Javier (TTI NORTE SL)

Presenter(s) : Mr. PEREZ, Javier (TTI NORTE SL)

Contribution ID : **9** Type : **not specified**

Alibava Systems

Tuesday, 25 June 2013 09:30 (15)

ALIBAVA SYSTEMS S.L. was born from the long collaboration of three research institutes: IMB-CNM (CSIC), Barcelona, Spain; IFIC (CSIC), Valencia, Spain; and University of Liverpool, UK; in the field of radiation detectors for Particle Physics applications. Actually, the name of the company comes from this collaboration (LIverpool, BArcelona, VAlencia). Several researchers from these institutes felt the need to develop laboratory instruments and solutions for the characterisation of radiation sensitive detectors. They developed different solutions that were a success, not only for them, but also for their international collaborators. At the view of this success, they have decided to create the Company in order to expand their possibilities and create the proper environment for more developments.

http://www.alibavasystems.com/

Summary

Oral or poster presentation

Both oral and poster

Primary author(s) : Prof. LOZANO, Manuel (IMB-CNM (CSIC))

Presenter(s) : Prof. LOZANO, Manuel (IMB-CNM (CSIC))

Contribution ID : **10** Type : **not specified**

Un Telescopio Compton para la Monitorización de la Terapia Hadrónica

Tuesday, 25 June 2013 09:45 (15)

La terapia hadrónica es una técnica de radioterapia del cáncer que usa haces de partículas cargadas (iones) para destruir células tumorales. Mientras que los rayos X convencionales atraviesan el cuerpo humano depositando energía conforme pasan, los iones depositan su energía prácticamente en un punto (el pico de Bragg). Una vez se conoce la posición del tumor con precisión, la hadronterapia es mucho más conveniente, en particular en tumores cercanos a órganos críticos, puesto que reduce considerablemente la dosis de radiación en los tejidos sanos que rodean al tumor. La precisión en la deposición de la energía es un reto crucial cuando se tratan órganos en movimiento así como para adaptar la irradiación conforme el tumor reduce su tamaño a lo largo del tratamiento. En consecuencia, el control de calidad y la monitorización in vivo son aspectos esenciales para un resultado efectivo del tratamiento del cáncer.

Con el fin de mejorar los útiles para el control de calidad en terapia hadrónica, la comisión europea aprobó el proyecto ENVISION (European Novel Imaging Systems for Ion Therapy) que trata de proporcionar soluciones para:
La monitorización no invasiva en tiempo real,
Determinación de la dosis proporcionada,
Un nivel de respuesta rápido para adaptar y corregir el plan de tratamiento,
Respuesta en tiempo real para órganos en movimiento y
Estudios de simulación.

A día de hoy el único método no invasivo "en-haz" implementado y probado es la localización de los isótopos emisores de positrones que se producen durante el tratamiento mediante técnicas PET (Positron Emission Tomography). Es lo que se llama "in-beam PET". Esta técnica, aunque funciona, tiene limitaciones debido a que el anillo PET no es continuo ya que interacciona con el sistema de distribución del haz en la sala de tratamiento. Esta técnica, por tanto, se emplea mayoritariamente "off-beam" en habitáculos separados una vez termina la terapia, con la consiguiente pérdida en el número de desintegraciones registradas y su impacto adverso en la calidad de la predicción de la dosis y su localización.

Una alternativa es el uso de fotones ("prompt gammas") producidos por la interacción del haz de iones con los tejidos. En contra de lo que ocurre en el caso de in-beam PET, esta técnica es nueva y se encuentra en sus fases más tempranas de desarrollo.

Uno de los retos más importantes es la reconstrucción de la trayectoria de los fotones producidos, que pueden tener energías de hasta unas pocas decenas de MeV, con el fin de determinar su vértice de producción y, mediante éste, la posición del pico de Bragg. El proyecto ENVISION trata de resolver este problema con la construcción de telescopios Compton. En particular, nuestro grupo en el IFIC propone el desarrollo de un telescopio Compton formado por varias planos detectores, cada uno de ellos compuesto por un cristal centelleador continuo de LaBr3 acoplado a matrices de fotomultiplicadores de silicio (SiPMs). El objetivo es tener suficientes planos detectores como para poder reconstruir la trayectoria del fotón mediante sus interacciones Compton en cada uno de los centelleadores sin necesidad de absorber totalmente el fotón.

Nuestro grupo ha construido un primer prototipo de un telescopio Compton con planos centelleadores de LaBr3 y de LYSO. Los centelleadores se acoplan a sus correspondientes matrices de SiPMs que se leen por medio de un ASIC. Junto con este sistema se ha desarrollado también un sistema de adquisición de datos compacto que se comunica con un ordenador personal vía ethernet para la transmisión de datos y el control de la adquisición. El rendimiento del prototipo ha sido

evaluado en el laboratorio con fuentes radiactivas de rayos gamma de diferentes energías, hasta 1275 keV y en la línea experimental del ciclotrón del CNA.

Summary

Oral or poster presentation

Oral

Primary author(s) : LACASTA, Carlos (IFIC-Valencia); LLOSÁ, Gabriela (IFIC-Valencia)

Co-author(s) : SOLAZ, Carles (IFIC-Valencia); TORRES, Irene (IFIC-Valencia); GILLAM, John (IFIC-Valencia); TROVATO, Marco (IFIC-Valencia)

Presenter(s) : LACASTA, Carlos (IFIC-Valencia)

Contribution ID : **11** Type : **not specified**

R&D activities of CIEMAT's Nuclear Innovation Unit

Monday, 24 June 2013 13:15 (15)

The Nuclear Innovation Unit is a research group devoted to has the mission of contributing to the development of advanced nuclear fuel cycles which will facilitate the nuclear waste management and improve the sustainability of nuclear fission as an energy source, including the design of advanced reactors and accelerator driven systems (ADS).

The main technological capabilities of the group will be presented at the time of the workshop:

- Calculation of complete electronuclear energy production schemes, including waste management scenarios with reprocessing and cost estimates.
- Advanced Monte Carlo simulations with MCNPX and GEANT4 for the design of neutron and γ -ray shielding and facilities with neutron sources.
- Design and characterisation of neutron and γ -ray detectors.
- Design and construction of digital data acquisition systems.

An overview of the different R&D projects with technological impact in which the research group is involved will be given as well.

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. CANO OTT, Daniel (CIEMAT)

Presenter(s) : Dr. CANO OTT, Daniel (CIEMAT)

Contribution ID : **12** Type : **not specified**

DISPOSITIVOS DE CONTROL DE ENERGIA

Tuesday, 25 June 2013 11:45 (15)

Proteger a trabajadores de lesiones producidas por la activación de algún tipo de energía durante el funcionamiento o mantenimiento de los diferentes equipamientos.
Electrica
Disyuntores, Interruptores, Fusibles
Química/Liquida/Aire
Valvulas, Desconexiones Neumaticas, Cilindros, Lineas hidraulicas, aire a presión
Gases o sustancias peligrosas
Térmica
Superficies Calientes y sustancias calientes
Gravitacional
Objetos o equipamientos por encima de la cabeza que pueden caer , golpear o aplastar
Fallo de establecimiento e implementación de una LOCKOUT PROGRAM/POLICY ESCRITA
Fallo en desarrollar y utlizar PROCEDIMIENTOS ESCRITOS ESPECIFICOS PARA CADA MAQUINA
Fallo en no realizar INSPECCIONES PERIODICAS de los procedimientos de control de energias
Fallo en NO proporcionar formaciones a los empleados
Fallo de definición de alcance de las medidas y reglas a utilizar, y los medios para reforzar el cumplimiento normativo
Fallo en proporcionar y utilizar los adecuados DISPOSITIVOS DE CONTROL DE ENERGIA
Los procedimientos de LOTO especificos por maquina para los equipos con mas de una fuente de energia son tremendamente importantes
Estos procedimientos deben estar documentados e identificar el equipamiento que cubren
Un procedimiento debe ser creado para cada pieza del equipamiento que se debe bloquear
EL procedimiento debe incluir pasos especificos para desconexión, aislamiento, bbloqueo, y securización de los equipos para el control de las energias peligrosas
El procedimiento debe incluir pasos especificos para la colocación, transferencia y retirada de los dispositivos LO/TO
El empleador debe realizar y certificar inspecciones periodicas de los procedimientos de LOTO al menos una vez al año

Summary

Oral or poster presentation

DISPOSITIVOS DE CONTROL DE ENERGIA

Primary author(s) : Mr. EDUARDO, GAMERO (FERPESA)

Presenter(s) : Mr. EDUARDO, GAMERO (FERPESA)

Contribution ID : **14** Type : **not specified**

A non-invasive gamma-camera for 3D imaging

Monday, 24 June 2013 11:45 (15)

I will present a novel concept for 3D gamma-ray imaging[1], which is based on the principle of positron annihilation Compton scattering. The proposed device comprises a positron source, which is placed outside of the object under study. One of the 511 keV gamma-rays is registered directly in one detection plane (a position sensitive gamma-ray detector), whereas the second 511 keV annhilation gamma-ray undergoes a Compton scattering in the object to be imaged, and is simultaneously detected (in time-coincidence) by means of a second position and energy sensitive gamma-ray detector (orthogonal to the former detector).
A proof-of-concept prototype for such 3D gamma-ray camera is being developed at IFIC. The primary aim of such device is the spatial characterization of the electrical response of highly-segmented semiconductor germanium detectors. Once characterized, these germanium detectors can be used for high-resolution gamma-ray spectroscopy and nuclear structure studies. However, provided that the detection sensitivity of the 3D camera is sufficiently high, one could find another implementations, such as e.g. non-invasive industrial or geological diagnostics, as well as for security inspection of concealed items.

[1] C. Domingo-Pardo, Nucl. Instr. and Meth. A, 675, 123-132 (2012).

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. DOMINGO-PARDO, Cesar (IFIC (CSIC-University of Valencia))

Presenter(s) : Dr. DOMINGO-PARDO, Cesar (IFIC (CSIC-University of Valencia))

Contribution ID : **15** Type : **not specified**

DESARROLLO DE NUEVOS MATERIALES PARA RADIOPROTECCIÓN

Introducción
La empresa Arraela S.L. ha desarrollado diferentes materiales de blindaje para su uso frente a los distintos tipos de radiación.
Para blindajes frente a la radiación neutrónica se ha desarrollado la masa CONTEK®-RNH. Esta masa combina diferentes materiales lo que permite tanto el frenado de los neutrones rápidos, debido a la alta concentración de hidrógeno, que es un eficaz moderador neutrónico, como la captura de los neutrones térmicos, debido al alto porcentaje de boro, que presenta una gran capacidad de absorción de neutrones térmicos.
Para atenuar la radiación fotónica y/o electrónica se han desarrollado dos materiales, CONTEK®-RFH1 y CONTEK®-RFH2. El primero de los materiales, CONTEK®-RFH1, es un hormigón pesado fabricado a partir de un árido con un porcentaje en hierro muy alto, lo que confiere a la masa una densidad muy alta, en torno a 4 g/cm3, casi el doble de la densidad que tiene el hormigón estándar.
La segunda de las masa desarrolladas con el objetivo de blindar la radiación fotónica, CONTEK®-RFH2, se fabrica con el mismo mineral de hierro que la CONTEK®-RFH1, lo que le confiere iguales características para atenuar la radiación, pero además en su desarrollo se usa un cemento a base de aluminato lo que le confiere al hormigón una gran resistencia frente a las altas temperaturas, siendo esta masa resistente estructuralmente a temperaturas de 1200 ºC.
La última de las masas estudiadas, CONTEK®-RFB, es una masa fabricada a base de hidrocarburos, y con una distribución homogénea de mineral. El mineral variará dependiendo del tipo de radiación que se desee blindar. Este material se convierte pues en un producto versátil, que sirve tanto para atenuar la radiación neutrónica como la fotónica.
Resultados
A continuación se muestran las capacidades de atenuación de los distintos materiales frente a los distintos tipos de radiación. Estos valores han sido obtenidos a partir de los trabajos realizados en el Hospital Meixoeiro de Vigo y en el Grupo de Investigación en Radiofísica de la USC (TABLAS CON DATOS DE TVL).
Productos
Con los materiales desarrollados se fabrican tanto hormigones vertidos, como prefabricados y puertas de radioprotección, así como también piezas a medida para la fabricación de búnkeres móviles y todo tipo de piezas especiales.
Las masas CONTEK®-RFH y CONTEK®-RX tienen capacidad estructural (las resistencias a compresión mayores que 40 MPa). Existe una variante de CONTEK®-RFH2 que mediante un tratamiento especial patentado por Arraela, permite alcanzar resistencias a compresión superiores a los 90 Mpa.

Summary

Oral or poster presentation

POSTER PRESENTATION

Primary author(s) : Mr. CARUNCHO RODADO, JUAN MANUEL (ARRAELA S.L.); Ms. FUENTES VAZQUEZ, VERONICA (ARRAELA S.L.)

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Presenter(s) : Mr. CARUNCHO RODADO, JUAN MANUEL (ARRAELA S.L.)

Contribution ID : **16** Type : **not specified**

PROYECTOS DE TECNOLOGÍA EN EL CIEMAT EN EL ÁMBITO DE LA FÍSICA DE PARTÍCULAS

Tuesday, 25 June 2013 13:15 (15)

El CIEMAT mantiene varias líneas de proyectos tecnológicos relacionados con Física de Partículas, en colaboración con la industria y con resultados potencialmente transferible al sector privado. En esta ponencia se hace una revisión, no exhaustiva, de algunas actividades representativas en este campo llevadas a cabo en los últimos años en las Unidades de Ingeniería Eléctrica, Electrónica y de Aplicaciones Médicas.

Un grupo de la Unidad de Ingeniería Eléctrica del Departamento de Tecnología del CIEMAT, trabaja desde hace más de veinte años en el desarrollo de diferentes tecnologías para aceleradores de partículas. Estas actividades abarcan superconductividad, radiofrecuencia, dinámica de haces, diagnósticos, imanes convencionales, imanes especiales o sistemas de alimentación y control y están encaminadas tanto a la participación en grandes colaboraciones internacionales como LHC, XFEL, FAIR o AMS como al desarrollo de pequeños aceleradores propios. Estas actividades mantienen una fuerte participación de la industria, tanto en la fase de desarrollo de prototipos, como en la de fabricación de series de componentes. Se describe algunos de los desarrollos más significativos que el grupo está realizando actualmente, tanto para grandes instalaciones internacionales como para el desarrollo de un demostrador de miniclotrón superconductor compacto para producción de radioisótopos PET, esta última actividad en colaboración con la Unidad de Aplicaciones Médicas. Se analizan los diferentes componentes realizados, las tecnologías involucradas y también la participación industrial en estas actividades.

En complementación con las actividades en aceleradores, se presenta un proyecto que se desarrolla en el CIEMAT en el ámbito de microelectrónica. Como resultado de tecnología desarrollada inicialmente para actividades de astrofísica de partículas, se trabaja en el desarrollo y caracterización de un ASIC para lectura frontal de detectores para imagen molecular PET, basado en la tecnología time-over-threshold. El perfil de esta actividad es doble: por una parte, de investigación básica; por otra, de carácter aplicado con potencial interés al sector industrial.

Summary

Oral or poster presentation

Oral

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Presenter(s) : JOSE MANUEL, Pérez (CIEMAT)

Contribution ID : **17** Type : **not specified**

Added Value Solutions: Experiences in the field of particle physics. From the CAD-station to the real world.

Tuesday, 25 June 2013 12:15 (15)

Added Value Solutions is a company focused on the development of challenging devices and mechanisms. From particle accelerators to space missions, including installations for in-situ mechanization of nuclear powered submarines parts or windmill blades, the main objective is to boldly grow joining innovative and challenging R&D projects whilst helping public institutions to reach its own objectives.
AVS skills in design, manufacturing, integration, tests and delivery under ISO 9100 certification provided the path to work with renowned institutes in the field of nuclear and particle physics i.e. CERN, CIEMAT, STFC, RAL, ILL, HZB, ESRF… Different shades of projects like XFEL, HIE-ISOLDE, IFMIF, ISIS or ESS-Bilbao were reached, covering from the source to the target of current state of art particle accelerators and beyond. In addition, AVS has recently spread out its presence in the fields of astrophysics and space (ESA).
In this work, a brief description of AVS and projects already delivered will be presented. Comments from the experience on the two sides of the transfer technology coin will be presented also as a seed for subsequent discussions in the topic.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. GARBAYO, Alberto (AVS); Dr. CARMONA, Jose Miguel (AVS); Mr. CARRERA, Miguel Angel (AVS)

Presenter(s) : Dr. CARMONA, Jose Miguel (AVS)

Contribution ID : **18** Type : **not specified**

Particle detector developments at Scientifica International

Tuesday, 25 June 2013 10:30 (15)

SCIENTIFICA INTERNACIONAL, S.L. is a company devoted to the development, manufacturing and commercialisation of instrumentation equipment for the science market, based in Elgoibar, northern Spain.
With experience and technical skills in 3 main core technologies, such as, precision mechanics, electronics & signal processing, and composite materials, SCIENTIFICA has collaborated with several European scientific facilities and institutions, like, ISIS, CIEMAT, ESS-Bilbao, ILL, HZB and CERN.
Its main product in the particle detection line is the neutron detector for neutron scattering applications. SCIENTIFICA has delivered detectors for neutron scattering facilities, like ISIS (UK), and has developed its own Position Sensitive Neutron Detector technology which will be soon in the market.
Together with this technology, SCIENTIFICA is also involved in developments for other applications in the field of particle detection. These developments are carried out internally or in collaboration with various scientific facilities, all around the world.
This oral presentation will show the most relevant developments of SCIENTIFICA and some notes regarding its experience in collaborating with scientific laboratories: potential mutual benefits , and aspects to take in to account to succeed in this activity.

Summary

Oral or poster presentation

Oral presentation

Primary author(s) : Mr. GONZALEZ LARREA, Lander (Scientifica International, S.L.)

Presenter(s) : Mr. GONZALEZ LARREA, Lander (Scientifica International, S.L.)

Contribution ID : **19** Type : **not specified**

A compact and low cost dosimetry system based on MOSFET

Monday, 24 June 2013 12:00 (15)

In this work we present a handheld dosimetry system for radiotherapy developed at the Departmento de Eléctronica y Tecnología de la Computación of the Universidad de Granada in collaboration with the Departmento de Física Atómica, Molecular y Nuclear also from Universidad de Granada and the Hospital Universitario "San Cecilio" of Granada.

The use of MOSFET dosimeters for in-vivo dosimetry has increased notably in the last few years due to some advantages such as their immediate and non-destructive readouts, low power consumption, easy calibration, and reasonable sensitivity and reproducibility [1]. The basis of these devices is that the absorbed dose is approximately proportional to the shifts in the threshold voltage of the MOSFET [2].

In our dosimetry system a general purpose commercial pMOS transistor is used as sensor to detect the ionizing radiation. This implies an important cost reduction. The reader unit implements several algorithms that permit to extend the linear range above mentioned [2] and to carry out a thermal compensation [3]. Thanks to these algorithms, and it can be seen in table 1, the resolution of system makes it feasible for in-vivo dosimetry even with the commercial transistor we have used [4]. Three groups of four dosimeters were irradiated in a 60Co source and in a LINAC with normal incidence with qualities photons of 6 and 18MV. The correlation factors found for these dosimeters ware, at least, 0.993, and the medium sensitivity are summarized in the table 1.

Table 1: Technical specifications

Temperature range 20–36 ºC Thermal drift < 3 mGy/ºC
Resolution 2 cGy Delay after irradiation 5 minutes
Accuracy Maximum incidence angle (º)
LINAC Angle <60º ± 3% Sensitivity (mV/Gy)
60º < Angle < 75º ± 4% 60Co 24.3 ± 0.9
60Co source Angle up to 90º ± 3% 6 MV **() 20.1 ± 0.8**
Linear range 15 Gy 18 MV () 20.0 ± 1.7
Use range *() 50 Gy*
Angles: 60Co ± 90
LINAC (up to 18MV) ± 75
() With recalibrations
(**) Build-up cap of 0.5 mm brass, irradiation field of 10x10cm2 and individual calibration

Aknowledgements:
The authors acknowledge the Hospital Universitario "San Cecilio" for permitting us to use the LINAC installations. This work has been supported in part by the Junta de Andalucía (P09-FQM-0534 and P10-TIC-5997), the Ministerio de Ciencia e Innovación (FPA2009-14091-C02-02) and CEI-BoiTic Granada (Desarrollo de un sistema dosimétrico basado en MOSFETs comerciales para RIO).

References

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[2] Carvajal et al., Sensors and Actuators A 157 (2010), 178–184.
[3] Carvajal et al., Phys. Med. Biol. 56 (2011), 3535–3550.
[4] Carvajal at al., Sensors and Actuators A 182 (2012), 146–152.

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. CARVAJAL RODRIGUEZ, Miguel Angel (UGR, Department of Electronics)

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Presenter(s) : Dr. CARVAJAL RODRIGUEZ, Miguel Angel (UGR, Department of Electronics)

Contribution ID : **20** Type : **not specified**

Potential areas of interest of the GRID and e-Science Group at IFIC in the Technology Transfer

Monday, 24 June 2013 17:45 (15)

The Group of GRID Computing and e-Science at IFIC has developped their activities since 1999. The main and continuos commitment has been the development, instalation and deployment of an GRID Infrastructure for the ATLAS Experiment: the Spanish ATLAS Tier-2. Some important details and achievements will be given. On the other hand, the Group has been involved in several ICT projects mainly related to the EU Framework Programs. Another projects and collaboration agreemens have been in the basis of the dayly work of the Group.
The expertise obtained from the exercise of this period of 14 years will be summarized: the installation, maintenance and operation of a Distributed COmputing Infrastructure (GRID), the involvement in middleware tests, the User Support activities, migration and porting of scientifical applications to the GRID environment, software developments, etc.
Finally it will be listed the main areas of interest from the point of view of the Technology Transfer trying to identify potencial interactions in the private and public sectors

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. SALT, JOSE (IFIC)

Presenter(s) : Dr. SALT, JOSE (IFIC)

Contribution ID : **21** Type : **not specified**

Ion Traps and Lasers Technology Developments: Perspectives in Spain

Tuesday, 25 June 2013 12:45 (15)

In 2010 we started the first experimental activity at the Department of Atomic, Molecular and Nuclear Physics at the University of Granada. Today we have almost completed the first research laboratory in the department funded by the European Research Council (primary funds) and by the Spanish Ministry for Economy and Competitiveness through several projects. The total investment will be above two millions euro and we have started to form in this non-existing field in Spain, engineers and physicists. The first goal was to create the infrastructure around which we can make further developments in collaboration with the Spanish industry, a process which has been accomplished with respect to precision machinery. We foresee before the end of this year to start developing complex electronics for ion detection at cryogenic temperature and laser physics. In this contribution, we will show the existing infrastructure, the investment done in Spain, and discuss the ways to further interact with the Spanish industry in the short and medium-term future.

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. RODRÍGUEZ, Daniel (Universidad de Granada)

Presenter(s) : Dr. RODRÍGUEZ, Daniel (Universidad de Granada)

Contribution ID : **22** Type : **not specified**

Servicio de Datación Absoluta - Laboratorio de Radiaciones Ionizantes

Monday, 24 June 2013 13:30 (15)

EL Laboratorio de Radiaciones Ionizantes de la Universidad de Salamanca realiza desde hace más de veinte años medidas para el control de la radiactividad ambiental en diferentes tipos de muestras, ofreciendo sus servicios tanto a instituciones públicas como privadas. Su labor en la optimización de técnicas como la espectrometría gamma y la espectrometría alfa, junto con la reciente adquisición de un sistema de centelleo líquido de ultra-bajo fondo, le permiten aunar en un mismo servicio una completa variedad de determinaciones entre las que se encuentran las dataciones absolutas con radionuleidos naturales que abarcarían todo el Cuaternario. En el próximo año, se constituirá el nuevo Servicio de Datación Absoluta que como parte del Laboratorio de Radiaciones Ionizantes reunirá todos los análisis y técnicas de datación puestas a punto siguiendo los criterios del sistema de calidad implantado de acuerdo a la ISO17025:2005. Aquí presentaremos todas las técnicas de las que disponemos así como los trabajos de investigación que en estos momentos estamos realizando útiles en el desarrollo de detectores de germanio para espectroscopía gamma.

Summary

Oral or poster presentation

oral y poster

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Presenter(s) : Dr. QUINTANA ARNÉS, Begoña (Universidad de Salamanca)

Contribution ID : **23** Type : **not specified**

The Company ATI SISTEMAS, S.L. and its collaboration with the Basic Nuclear Physics Unit at CNA

Tuesday, 25 June 2013 13:00 (15)

ATI SISTEMAS, S.L. was born in 1993 as an industrial service company, providing solutions for the power plants of its original area (NW of Spain, Galicia).
Over time the activity as a company has diverted, and nowadays 6 main fields of activity are developed:
- Scientific research: supply of equipment; collaboration and development agreements
- Industrial services: Engineering, Automation, Process service, Installation
- Air conditioning and heating solutions
- Fire protection solutions
- Calibration laboratory (industrial instruments)
- Heat tracing solutions

ATI SISTEMAS, S.L. has a strong presence in the north of Spain, and is strategically located to cover the whole territory of Spain.
The human strength of ATI SISTEMAS, S.L. is formed to this day by 100 people.
Over time, we have established solid relationship and commercial agreements with a number of scientific equipment manufacturers. All of these are a strong reference in the research field, developing state-of-the-art electronics and detection devices for various applications:
- CAEN: daq systems, power supply systems. Protocols NIM, VME
- WIENER: daq systems, power supply systems. Protocols NIM, VME, CAMAC
- BSI: High purity Germanium detectors, CdZnTe/CdTe detectors
- MICRON Semiconductors: dedicated strip silicon detectors. Diamond detectors.
- SCIONIX: scintillation detectors
- SAINT-GOBAIN: crystals and dedicated detectors for nuclear physics.

The company ATI Sistemas S.L. has recently established a scientific collaboration with FIUS (Seville University Research Foundation), through the Basic Nuclear Physics Unity at the CNA, under the contract/project entitled “Experimental Development for Physical and Engineering Research” (CP1751:CGT0636).
Through the collaboration between ATI Sistemas S.L. and the University of Seville, developed technologies can be transferred to specialized enterprises, in order to provide different new product(s) to the society.
ATI Sistemas S.L. is a partner for complementary works that could not be performed at University workshops, and a partner to find solutions for any kind of experimental problems during the research projects. For this purpose, ATI Sistemas S.L. can send its technicians and engineers to learn about the CNA research and find applications for the nuclear instruments and techniques developed at CNA. Technical and engineering staff, from ATI Sistemas S.L. or other enterprises represented by ATI Sistemas S.L., can provide demonstration (demo) equipment, give presentations, seminars, practical activities during Master courses, related to nuclear instrumentation, participate in workshops and finally negotiate training opportunities to the CNA staff. Such training can be performed at other companies, which are dedicated to nuclear instrumentation developments related to particle accelerators.
ATI Sistemas can also study and offer solutions related to several processes performances at the

CNA facilities: electrical and mechanical installations, gas systems, air conditioning and fire protection among others.
CNA can offer detectors and electronics laboratories, experimental lines, extra technical support, besides organizing seminars, courses, practices, workshops where the whole staff of CNA could participate.

Summary

Oral or poster presentation

Both

Primary author(s) : Mr. ALVAREZ, MARCOS (UNIVERSITY OF SEVILLE); Ms. TRUEBA, MARTA (ATI SISTEMAS)

Presenter(s) : Ms. TRUEBA, MARTA (ATI SISTEMAS)

Contribution ID : **24** Type : **not specified**

New irradiation facilities for components testing at the CNA

Monday, 24 June 2013 16:00 (15)

The reliability of a device under radiation can be studied, among others, based on the eventual impact of a particle (Single Event Effects, SEEs) or according to a given dose of radiation accumulated (Total Ionization Dose TID). In the last years, the National Centre for Accelerators (CNA) has developed part of its own research studying the production of circuit failures "in vivo" due to different particles radiation, varying the energy and fluence. Starting up in the framework of CEIDES Project, subproject of *RENASER +.

In this work, we will present the new capabilities of the CNA to perform components irradiation testing. Thanks to its status as ICTS, the CNA has installed one gamma radiation equipment for research, model Gammabeam ® X200 (GBX200) Best Theratronics company. The source installed in the irradiator of this Centre, with an initial activity of 434 TBq (11,725 Ci), has become the most active in our Country. This will encourage photon irradiation studies, complementing the research in particles irradiation developed in the 3 MV tandem and cyclotron accelerators.

The new facility is available for use by the whole scientific community and companies interested in different fields of application. At first, the laboratory set-up is being done together with the company ALTER Technology (Member of TÜV NORD) within the RADLAB project, which is associated to INNPACTO scientific program and funding by MINECO. The primary objective is to perform irradiation tests of total dose on electronic devices for aerospace application. Besides aerospace, the facility is intended to use for applications in High Energy Physics, Materials Science, Biomedical or ionizing radiation metrology.

The RADLAB project also involves the starting up of a neutron irradiation facility to study different SEEs in electronic devices. The energy spectrum of the atmospheric neutrons ranges over more than 10 orders of magnitude but the main focus is on the high energy end (>10 MeV). These neutrons cause most of the SEE in microelectronics. In particular, it has been shown that atmospheric neutron SEU and SEFI cross-sections from 14 MeV neutrons are within <2 compared to neutron beams from spallation sources. Neutron beams suitable for such studies can be produced by the Cyclotron and Tandem at CNA through the 3H(d,n)4He reaction. Preliminary studies will be performed by means the 2H(d,n)3He reaction.

- RENASER + (TEC2010-22095-C03) es un Proyecto Coordinado donde participa Universidad de Sevilla, Universidad Carlos III de Madrid y Universidad de Alicante.

Summary

Oral or poster presentation

oral

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Presenter(s) : Mrs. MUÑIZ, Gema (Centro Nacional de Aceleradores)

Contribution ID : **25** Type : **not specified**

"A detection system to obtain 2D dose maps for Complex Radiation Therapy Treatment Verification"

Radiation and particle therapy are techniques widely used in cancer treatments, in continuous progress. In this context, new systems for complex radiotherapy treatment verification are being developed.
RADIA is the Seville collaboration which involves the Department of Atomic, Molecular and Nuclear Physics (FAMN) and the Engineering School of the University of Seville (US), the Basic Nuclear Physics group at CNA, the Virgen Macarena Hospital and the private company Inabensa S. A. RADIA was established to study the feasibility of using silicon strip detectors to verify complex radiotherapy treatments [1-4]. In addition to RADIA, the Department of FAMN and CNA took part into the "Diagnostic Techniques for future particle Accelerators Network" (DITANET), and take part into other European projects such as the international collaboration "Fragments and Ions Relevant for Space and Therapy" (FIRST) and "optimization of Particle Accelerators" (oPAC).
In this contribution we focus on the description and first tests of a new detector and its particularly designed DAQ, which are part of a specifically conceived and developed dose verification system, in order to improve the spatial resolution and the acquisition time for the verification of a whole treatment. The novel online system is composed by:
a) the new detector; b) the data acquisition system (DAQ); c) a control interface for the DAQ; d) a mechanical phantom also specifically designed to store the detector minimizing the air gap; e) reconstruction algorithms for the dose map and Monte Carlo simulations.
Through the collaboration between the University of Seville and the private Spanish company ATI Sistemas S.L., a dual chip 32x32 single sided silicon strip detector was proposed to Micron Semiconductor Ltd. (UK), which was the company responsible for constructing it. This is the first silicon strip detector in which the whole composition is based specifically on clinical constraints.
A new data acquisition system with 64 channels has been specifically designed for this application, with the capability of reading every strip of the detector, allowing to take the maximum advantage of its sensitivity. We present the study of the response of the DAQ versus the characteristics of the integrator of the current generated by the radiation. This study aims to optimize the capacitors charge curve as a function of the applied radiation.

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3) Nuclear Instruments and Methods A: Accelerators, Spectrometers, Detectors and Associated Equipment– NIM A 673 (2012) 98-106;
4) Physical Review Special Topics: Accelerators and Beams 15, 042802 (2012).

Summary

Oral or poster presentation

Poster

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Presenter(s) : Ms. OVEJERO MAYORAL, maria del carmen (universidad de sevilla)

Contribution ID : **26** Type : **not specified**

Printed-circuit solutions for nuclear experiment setups

Monday, 24 June 2013 16:30 (15)

The use of increasingly segmented silicon detectors in nuclear reaction experiments poses challenging
constraints on the design of the experimental chambers, as several detectors and related pieces should be placed in a extremely reduced space, attending to the experimental positions required by
the physics of the experiment. At the same time, a large number of signals (usually in excess of 100)
must be routed out of the chamber to the preamplifiers sitting outside.

Traditionally this has been done with coaxial feedthroughs, but they introduce several problems of
their own: sealing o-rings are prone to leaks and the solderings usually get brittle after several uses, leading to shortcuts or missing channels. Besides, placement of the detectors is also compromised as the bulky of 32+ pole cables (plus jacket) put unwanted stresses on them. Achieving
the required position precision for the detectors is sometimes also hard.

We present several related solutions to those problems using Printed Circuit Boards (PCBs) both for placement and feedthrough. Use of multilayered PCBs allows for large improvement in feedthrough density (taken as number of signals fed-through per unit area), usually several times the achieved with the standard coaxial feedthroughs, at a fraction of the cost. In an alternative design, the use of PCBs all the way to the preamp, minimizes both the cable use and the number of connectors, restricting them only to the inner part of the chamber, where they are effectively isolated from RF noise. Signals come out shielded by ground planes all the way to the preamp.

Placement is also efectively achieved by plugging the detectors directly on a card. Using a two cards
stack arrangement, different setups can be achieved by switching cards without altering the preamp layout and calibrations.

We've succesfully tested a chamber design for 11Be experiment at TRIUMF (Canada), and developed a
second chamber for an incoming experiment at Jyvaskyla (Finland). Both designs are presented in the current talk.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. PEREA MARTINEZ, Angel (IEM/CSIC)

Co-author(s) : Prof. TENGBLAD, Olof (IEM/CSIC)

Presenter(s) : Mr. PEREA MARTINEZ, Angel (IEM/CSIC)

Contribution ID : **27** Type : **not specified**

Experiencia en innovación y transferencia de tecnología en Trinos Vacuum-Projects.

Monday, 24 June 2013 16:15 (15)

Este workshop, presenta a los participantes del CPAN Workshop on Technology Transfer la experiencia de la compañía Trinos Vacuum-Projects, en el desarrollo de proyectos de I+D tanto para terceros como propios, así como la labor que como empresa de ingeniería aportamos a departamentos de I+D en las fases iniciales de diseño y prototipado de la innovación.

En la primera parte se hace una breve descripción de los conceptos "Open Innovation" y "Lean Startup" para que sirvan como base de partida para centra la problemática con que se encuentran las PYMES ante la necesidad de innovar y como la colaboración con terceros es una estrategia que beneficia a ambas partes. Se profundizará en la necesidad de que la actividad de I+D esté enfocada a un retorno lo más rápido posible, para lo que es fundamental disponer de herramientas que permitan que el esfuerzo de la innovación esté claramente orientado hacia el mercado.

También se expondrá como la colaboración entre empresas e investigadores permiten agilizar las etapas iterativas del diseño y proponer soluciones ajustadas a los requerimientos de los clientes. A continuación se expondrán de forma breve las capacidades de la empresa Trinos Vacuum-Projects, S.L., en las áreas de diseño y fabricación de sistemas relacionados con las actividades del CPAN. Posteriormente se expondrá un ejemplo donde Trinos Vacuum-Projects, aporta su know-how a un tercero para el desarrollo de un proyecto científico en las etapas fundamentales de prototipado de la solución y como ésta colaboración permite una correcta validación de la innovación para el equipo de investigación y su posterior desarrollo con vistas a su explotación comercial.

En un segundo ejemplo, se expondrá como la colaboración con un equipo de investigación y un instituto tecnológico, han permitido a la empresa obtener el know-how necesario para el desarrollo de un equipo de deposición por láser pulsado, que gracias a la experiencia del investigador contratado en ese campo, cumple con las expectativas del mercado, y como su desarrollo mediante técnicas "Lean Startup" han permitido su comercialización posterior, al permitir una rápida adaptación del prototipo a las necesidades del cliente final.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. VERDÚ PEDREIRA, José (Trinos Vacuum-Projects, S.L.)

Co-author(s) : Mr. GÓMEZ-FERNÁNDEZ, José (Trinos Vacuum-Projects, S.L.)

Presenter(s) : Mr. VERDÚ PEDREIRA, José (Trinos Vacuum-Projects, S.L.)

Contribution ID : **28** Type : **not specified**

Presentacion de Sedecal

Monday, 24 June 2013 12:15 (15)

En el año 1994 se fundó, con capital íntegramente español, la empresa Sociedad Española de Electromedicina y Calidad, S.A; SEDECAL. Durante todo este tiempo hemos experimentado un crecimiento que nos ha situado como líderes mundiales en diseño y fabricación OEM de generadores de alta frecuencia y sistemas de rayos-x.entre otros logros. Hoy en día SEDECAL cuenta con seis divisiones líderes en su sector: División OEM, radiología médica; División Pre-clínica, PET, PET/CT, PET/MR; División Veterinaria, radiología veterinaria; División Healthcare, generación de ozono médico; División Industrial, control de potencia industrial y energías renovables; y División de Sub-contratación Industrial, tarjetas de circuito impreso, sistemas electrónicos y electromecánicos.
En el ámbito de la Investigación, Desarrollo e Innovación (I+D+i), SEDECAL no ha cejado en su esfuerzo asignando cada vez más recursos financieros a este capitulo y representando siempre una parte importante de sus presupuestos generales. Este trabajo constante ha situado a la compañía en un nivel tecnológico de primera línea, dando como resultado la generación de más de 750 puestos de trabajo directos y una actividad exportadora a más de 120 países, estableciendo sedes en Francia, USA, Hungría, Turquia y China.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. ARCO CASANOVA, Juan Manuel (Sedecal)

Presenter(s) : Mr. ARCO CASANOVA, Juan Manuel (Sedecal)

Contribution ID : **29** Type : **not specified**

University and Enterprise Developing Experiments and Instruments for Physics

The experimental Nuclear Physics beam line of the National Accelerators Centre (CNA) was designed and constructed to support Basic Nuclear Physics (FNB) studies: the development of nuclear instrumentation, more precisely, detection systems and fast electronics, besides measuring and analysing nuclear reactions, using, among others, the capabilities of the 3MV-TANDEM accelerator at CNA. The FNB-CNA research unit has defined such specific research lines due to their direct application in different fields as nuclear medicine, radiobiology, neutron physics and particle astrophysics. Thus, the experimental FNB beam line of CNA is used for testing nuclear instrumentation, which will be used to perform experiments in radioactive ion beam (RIB) facilities; neutron beam facilities and experiments, with special application in astrophysics; and, more recently, experimental measurements for radiobiological studies.
ATI Sistemas S.L. is one of the partners of the FNB-CNA research unit in this process. Through a specific collaboration between ATI Sistemas S.L. and the University of Seville, based on the contract/project (CP1751:CGT0636) and titled "Experimental Development for Physical and Engineering Research", developed technologies can be transferred to specialized enterprises, in order to facilitate the offer of different new products to the society. ATI Sistemas S.L. is also a partner for complementary works that could not be performed at University workshops and to find solutions for any kind of experimental problems during the research projects. For this purpose, ATI Sistemas S.L. can send its technicians and engineers to learn about the CNA research and find applications for the nuclear instruments and techniques developed at CNA. This scientific collaboration aims that technical and engineering staff, from ATI Sistemas S.L. or other enterprises represented by ATI Sistemas S.L., could provide demonstration (demo) equipment, give presentations, seminars, practical activities during Master courses, related to nuclear instrumentation, participate in workshops and finally provide training opportunities to the CNA staff. Such training can be performed at other companies, which are dedicated to nuclear instrumentation developments related to particle accelerators.
ATI Sistemas can also study and offer solutions related to several processes performances at the CNA facilities; among others: electrical and mechanical installations, gas systems, air conditioning, fire protection.

Summary

Oral or poster presentation

Poster

Primary author(s) : Mrs. FERNÁNDEZ, Begoña (Centro Naciona de Aceleradores); Mr. GONZALEZ ALVAREZ, Marcos (University of Seville)

Co-author(s) : Ms. TRUEBA, Marta (ATI)

Presenter(s) : Mrs. FERNÁNDEZ, Begoña (Centro Naciona de Aceleradores)

Contribution ID : **30** Type : **not specified**

Viability study of a detection system for complex radiation therapy treatment verification. Achievements of the Radia collaboration and ongoing developments.

Monday, 24 June 2013 12:30 (15)

In complex radiation therapy treatments with photons, such as Intensity Modulated Radiation Therapy (IMRT), dose distribution verification is highly advisable prior to real dose delivery to patient. In fact, the increasing sophistication and complexity of IMRT treatments is a major challenge for Treatment Planning Systems (TPS), which might miscalculate under some circumstances. We have developed a detection system for radiation therapy treatment verification based on a single sided silicon strip detector (SSSSD) housed inside a cylindrical phantom. This work started in the frame of the project Radia, a collaboration between the University of Seville, Instalaciones Inabensa S.A. (a company of Abengoa group), CNA and the Virgen Macarena University Hospital of Seville.
In our system, the detector is placed inside the cylindrical phantom with the detector plane perpendicular to the symmetry axis of the cylinder, and parallel to the radiation beam axis. This allows to obtain dose maps in axial planes, which are the most relevant in the process of treatment planning since they correspond, in general, to the orientation of the CT slices of the patient used during such process. This is the main innovation with respect to other recently developed systems, based on diode and ionization chamber arrays.
The cylindrical phantom is rotated so that data are taken for different relative orientations between the detector strips and the radiation fields. A software has been developed to operate the rotation of the phantom and to acquire the signals from the silicon strip detector. The dose maps are calculated from the set of data recorded for a certain sequence of relative orientations, using a reconstruction algorithm similar to that of computed tomography. A patent application of this procedure has been submitted to the Spanish Office of Patents (expedient nº P201101009).
Presently we are working on a new prototype, with these main improvements:
• A new detector, featuring a special configuration designed in collaboration with the Spanish company ATI Sistemas S.L., built by Micron Semiconductor Ltd. (UK). It consists of a dual chip 32x32 SSSSD, mounted back to back and using materials with densities as close as possible to water density.
• New electronics and software for phantom rotation control and for data acquisition and analysis, improving sensitivity, linearity and measurement bandwidth. Its performance is boosted with automated algorithms.
• A new phantom, more versatile than the previous one and with a better control of angular position.
• A new reconstruction algorithm to obtain the dose maps.

Summary

Oral or poster presentation

Oral

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Presenter(s) : Dr. ESPINO, José M. (Department of Atomic, Molecular and Nuclear Physics (FAMN), University of Seville, Spain)

Contribution ID : **32** Type : **not specified**

PET radiopharmaceutical production - Collaboration IBA Molecular Spain and Centro Nacional de Aceleradores

Monday, 24 June 2013 12:45 (15)

Molecular Imaging techniques have had an important development in recent years. Nuclear Medicine is the second imaging technique after CT, with more than 35 million procedures per year all around the world.

The Positron Emission Tomography (PET) has contributed in a crucial way to the Nuclear Medicine growth. In recent years the obtaining of fusion images has been improved using PET-CT hybrid systems that combine the metabolic information of PET image and the morphologic one of CT images in a single study.

The 18F-Fludesoxiglucose (FDG) has been the most widely-used radiopharmaceutical so far, although some new radiopharmaceuticals are arising, being more specific for some pathologies. These will allow an earlier and more accurate diagnosis, as well as they will enable the evaluation of the treatment response.

The number of PET examinations will double in the next 10 years, with a significant impact of the new radiopharmaceuticals on Alzheimer's diagnosis. Most of the new tracers will be proprietary products, with a limited suppliers number.

The PET radiopharmaceuticals production requires high investments and facilities with the corresponding radioprotection authorizations, as well as being in compliance with GMPs regulations. Their shelf-life makes it necessary that their production be carried out in facilities located in the vicinity of their users.

IBA Molecular Spain (IBA) is the Spanish subsidiary of IBA Molecular, a multinational company dedicated to the development, production and distribution of both PET and SPECT radiopharmaceuticals for their use in Nuclear Medicine. It is the leading company in Spain in the supply of these medicinal products.

The Centro Nacional de Aceleradores (CNA) is a scientific-technical facility dedicated to the interdisciplinary research and it has a cyclotron that provides 18 MeV protons and 9 MeV deuterons.

In 2003 IBA and CNA signed a contract that allows the production of several PET radiopharmaceuticals, as well as the research and development of new ones in their facilities.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. PEREZ BOADA, Andres (IBA Molecular); Mr. AMADOR BLANCO, Javier (IBA Molecular)

Presenter(s) : Mr. PEREZ BOADA, Andres (IBA Molecular); Mr. AMADOR BLANCO, Javier (IBA Molecular)

Contribution ID : **33** Type : **not specified**

Phoswich LaBr/LaCl portable compact detectors

Tuesday, 25 June 2013 10:45 (15)

In the framework of FAIR/R3B for the construction of the CALIFA spectrometer end cap There is a need of high dynamic range and calorimetric detection of both protons and gamma rays. This cannot be easily achieved with standard scintillators, so it is a field for novel solutions and materials.

Our proposal of a phoswich LaBr/LaCl configuration is attractive because of the high stopping power and high light yield of these materials, along with the fact of being optically compatible (i.e the latter being transparent to the scintillation light of the first one). This relaxes the need for completely stopping the particle to get its energy. In a phoswich configuration (2 different crystals shinning on a single PM), the different decay times of both scintillators produce changes in the shape of the light signal.

FPGA online processing running simple algorithms make possible to reduce this large stream of data in real time to a small set of parameters, including the energy and nature of the particle.

The compact detector thus created allows very portable solutions to be deployed in a variety of situations: homeland security scenarios, imported goods screening or enviromental natural radiation studies, among others.

Our current prototype is an arrangement of 4 phoswich xtals (2x2cm, 6+4cm LaBr+LaCl) sampled at
5 Gigasamples/sec 14bit 34 channels ADC (CAEN 1742). We present the results of the last protype test done in Krakow as of March 15th 2013.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. PEREA MARTINEZ, Angel (IEM/CSIC)

Co-author(s) : Prof. TENGBLAD, Olof (IEM/CSIC)

Presenter(s) : Mr. PEREA MARTINEZ, Angel (IEM/CSIC)

Contribution ID : **34** Type : **not specified**

High performance and compact digitizing developments for the DAQ systems of EXOGAM2/NEDA and AGATA nuclear physics experiments

Monday, 24 June 2013 17:15 (15)

This contribution aims to present the technological developments which are been carried out in the frame of the data acquisition systems for the EXOGAM2/NEDA and AGATA nuclear physics experiments.
For EXOGAM2/NEDA detector, we present a 14 bit, 200 Msps, 4-differential channel digitizer mezzanine card. The bandwidth of each channel is 30 MHz and the noise level is σ <1.5 LSB with and ENOB greater than 11. It includes a SPI protocol to remotely control the baseline for each channel independently. Four of these mezzanines can be housed in a NIM format card to conform a 16 channel low noise and high resolution DAQ system. The mezzanine can be easily controlled using an FPGA.
The other development presented is a control board module for the 12-channel digitizers boards of the AGATA gamma spectrometer. This module implements a virtual cable system via fiber optics for the execution of remote operations coming from the preprocessing system and controls the digitizers boards using an adhoc backplane. A set of 4 digitizer boards plus one control board can be housed in an standard mechanic setup and three of this boxes can be allocated in a standard 19-inches 3U subrack, giving a total of up to 144 channel digitizer compact system.
Both designs have been carried out with a cost-reduction and reusability principle as several other nuclear experiments could take profit of them with none or little modification. Emphasis will be put on these aspects of cost reduction in comparison to previous developments and the possibilities of using these developments in other present or near-future systems. Forecasts of greater integration plans of these systems will also be presented.

Summary

Oral or poster presentation

Oral

Primary author(s) : GONZÁLEZ MILLÁN, Vicente (Departamento de Ingeniería Electrónica. Universitat de Valencia)

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Presenter(s) : GONZÁLEZ MILLÁN, Vicente (Departamento de Ingeniería Electrónica. Universitat de Valencia)

Contribution ID : **35** Type : **not specified**

Single Event Effects Experiments at CNA

Monday, 24 June 2013 16:45 (15)

CMOS microelectronics is vulnerable to Single Event Effects, SEE. Essentially, a SEE is an undesirable particle detection due to parasitic solid state detectors inherent to CMOS structures. Macroscopically, the detection event shows as a device malfunction. For several years we have been doing SEE experiments at CNA, demonstrating the feasibility of that facility. CNA has "low" energy particle accelerators, out of SEE standards. However, CMOS miniaturization trend increases SEE vulnerability so nowadays the CNA facility can make full SEE studies for nanometric (130 nm and smaller) VLSI technological processes.
The results of our work are now used by companies like Alter Technologies or institutions like INTA or ESA. As spin off of the experimental research we have developed a new SEE electric emulators, FTUNSHADES 2, under ESA contract. FTUNSHADES has dual capabilities: it can localize SEE vulnerabilities in FPGA-emulated CMOS digital designs by electrical fault injection and can works, in the lab, as SEE monitor (i.e., "parasitic" detectors read out electronics). For analog electronics, and also under ESA contract, we are now developing new AHDL simulation techniques to assess fault injection, in order to predict experimental results.

Summary

Oral or poster presentation

ORAL

Primary author(s) : Dr. PALOMO PINTO, Fco.Rogelio (Escuela Superior de Ingenieros Universidad de Sevilla)

Presenter(s) : Dr. PALOMO PINTO, Fco.Rogelio (Escuela Superior de Ingenieros Universidad de Sevilla)

Contribution ID : **36** Type : **not specified**

Innovative vacuum applications? This is Solutions.

Monday, 24 June 2013 17:00 (15)

Oerlikon Leybold Vacuum is the Vacuum segment of the group Oerlikon, one the most innovative industrial groups in the world with over 12,700 employees at over 160 locations in 34 countries.

Oerlikon Leybold Vacuum is 160 years' experience in vacuum field, located in Cologne (Germany), 4 production sites and with 32 Sales and Service sites.

Aside usual components, one of the most important feature of Leybold Vacuum is his engagement in research and development, always looking for progress. It begins with new customers' requests, new challenges, and one Solutions department.

When some quotation request doesn't have a standard answer, it goes to Solutions. It is usually the case in R&D projects. Solutions offers a tailor-made concept based on customer requirements, including implementation. Solutions team do collaborate with customer, speak with customers, debates with customer, to find the right system solution and improve the process. Standard components or special solution, everything is possible, without losing a sight on the costs.

It is based on a real talk with customer and exchange of Expertise and Know-how. During the project Solutions is looking with customer for the suitable vacuum technology; optimizing the user application; determining the vacuum specific data; making calculations relating to process conditions; determining emissions and defining structure/dimension/design.

One example could be the installation done at CERN, at the CMS Detector. It was an extremely complicated pumping system installation behind a 7m thick wall of concrete for radiation protection. Oerlikon Leybold Vacuum mastered this challenge and obtained the CMS Gold Award 2008 for the successful design and installation of the requested vacuum system.

Summary

Oral or poster presentation

Oral

Primary author(s) : Mr. OSTROWSKY, Lothar (Oerlikon Leybold Vacuum)

Presenter(s) : Mr. OSTROWSKY, Lothar (Oerlikon Leybold Vacuum)

Contribution ID : **37** Type : **not specified**

Micro-gap gaseous detectors at Zaragoza University

Tuesday, 25 June 2013 10:00 (15)

Micro-gap gaseous detectors are a high-end technological family capable of reaching ultimate accuracy in the determination of energy (11%@5.9keV), time-of-flight (sub-50ps@ionizing radiation) and position (20um@ionizing radiation), depending on the architecture (micro-megas or multi-gap) and electronics of choice (charge or broad-band current sensing). The performance/cost figure of these solutions for the detection of X-rays or ionizing radiation remains unrivaled over large areas (1m2- 1000's m2). Concerning issues like time and position accuracy or radio-purity they actually represent the state of art of nowadays technology in many fields of application. For rare event searches (e.g. dark matter, neutrino-less double beta decay), the combined performance (energy and position accuracy, low workable threshold below 0.5keV, radio-purity) makes them an extremely promising technology, that has been for instance at the birth of the EU-funded TREX-project currently ongoing in Zaragoza University.

We will present results from a number of micro-gap architectures, developed in partnership with several international centers, obtained at the recently built lab at the Faculty of Science of the University of Zaragoza. In particular, we will focus on developments towards CAST(CERN), NEXT(Canfranc LSC), aimed at ultimate energy and position resolution, and sensor radiopurity. Recent developments on Radon monitoring and prospects for time resolution will be also summarized.

Summary

Oral or poster presentation

oral

Primary author(s) : Dr. GONZALEZ DIAZ, Diego (Universidad de Zaragoza)

Presenter(s) : Dr. GONZALEZ DIAZ, Diego (Universidad de Zaragoza)

Contribution ID : **38** Type : **not specified**

Imaging the guts: Introducing the Image Science Research developed in the Group IRIS

Monday, 24 June 2013 11:30 (15)

A part of the IRIS (Image Reconstruction, Instrumentation and Simulations in medical applications) group activities at IFIC is framed within the area of Medical Physics, specifically in the Image Science area, which is concerned with the mathematical description of the imaging process. Our activities are aimed at improving image quality in any emission tomography modality. To this end we organize our research in three master lines: a) elaborating mathematical models of physical processes involved in the image formation, b) development of dedicated image reconstruction software for prototypes and, c) optimizing the image reconstruction process.

Our know-how is of interest to any application that can profit form having tomographic images of the interior of systems (animals, humans, trucks, buildings,etc.) which inner parts are not easily accessed. This is mainly achieved through the application of imaging techniques based on the detection of ionizing radiation.

Summary

Oral or poster presentation

Oral

Primary author(s) : Dr. OLIVER, Josep F. (IFIC (CSIC-UV))

Co-author(s) : Dr. TORRES ESPALLARDO, Irene (IFIC (CSIC-UV)); Dr. RAFECAS LÓPEZ, Magdalena (IFIC (CSIC-UV))

Presenter(s) : Dr. OLIVER, Josep F. (IFIC (CSIC-UV))

Contribution ID : **39** Type : **not specified**

Ensa´s capability to design, manufacturing and test for nuclear components

Tuesday, 25 June 2013 13:30 (15)

Design, manufacturing and test. Highlighted Ensa´s
capability to manufacture big components with high quality level.

Summary

Oral or poster presentation

Oral

Presenter(s) : Mrs. MARTÍNEZ ASENSIO, Aldara (Equipos Nucleares S.A.)

Contribution ID : **40** Type : **not specified**

Opportunities and Challenges for Technology Transfer on CMOS Optical

Tuesday, 25 June 2013 13:45 (15)

Advanced societies require strong universities and research centres as well as strong industries. Experience
tells us that the best universities are usually located at countries that made a continued bid for industrial
leadership. And this is not only valid for applied science and technology, but for basic science as well. While
countries with limited industrial development may punctually be competitive on basic science, long term
competitiveness cannot be sustained without a companion, strong industrial development. On the one hand,
modern science benefits from industrial challenges. On the other hand, making significant advances in modern
science typically require huge investments which are hardly feasible for societies with un-healthy economies.
Effective university-industry cooperation requires that the two main characters recognize and respect mutually,
and that they are ready to collaborate in the right terms. University should not be contemplated by industry as a
source of cheap labor. Replicating the existing art by embedding it into products, can be an eventual requisite
for collaboration, but should not be the primary mission of university. Neither the primary mission of industry
is undertaking risky research endeavors with uncertain roads to marketable products. Just to mention an
example, R&D departments on prime line techno companies usually set around three-years latency for new
techniques to become marketable.
Spanish universities and research centers are today producing excellently educated PhDs who compete worldwide.
They do not have any problem to find well remunerated, challenging jobs abroad. And many of them are
leaving, thus undermining our system of science and technology. We all have the responsibility of creating
opportunities for these people, beyond staying at the centers were they were educated. It is clear that
universities and research centers should offer opportunities for some PhDs to renew and enhance their staff.
But, besides the education of future researchers and professors, the purpose of PhD programs should be to
educate people to work at technological industries, thus enriching our industrial issue and helping to build a

technologically competitive society. The other way around, industries should be aware that their competiveness will significantly increase by incorporating PhDs to their teams.
In 2004, and based on the knowledge devised after many years by a research group of the University of Seville
and the IMSE-CNM, myself and some colleagues started the company Innovaciones Microelectrónicas S.L.
(AnaFocus) in Seville. Todays, this company employs some 50 engineers out of which 20% are PhDs.
AnaFocus activities are in the field of smart CMOS optical sensors. CMOS imagers have evolved during the
last two decades to dominate the market of area imagers, with more than 90% of the total share. This evolution
has been basically fueled by consumer applications (mostly cell phones) with the prevalent trends of
decreasing the pixel pitch and with most relevant challenges focused on the design and optimization of the
photo-sensor devices themselves. Although cell phones will remain the dominant applications for CMOS
imagers, the market volume for other applications (such as machine vision, surveillance, military applications,
X-ray imagers, medical, etc.) is forecasted to reach some 0.7billion units in 2015. For many of these applications image resolution, although undoubtedly important, must be complemented with other features
such as speed and smartness. For instance, sensors intended for surveillance applications should be capable to
analyze complex spatial-temporal scenes and combine high-quality image recording of significant events with
high-speed decision making. Just to mention another example, scientific applications call for the smart
selection of salient points and region-of-interests and for the ultra-high-speed downloading of the so selected
areas. Finally, machine vision sensors (employed for instance for inspection) require image content analysis
and decision making to be made with largest possible throughput. All these features require the incorporation
of processing circuitry together with the photo-sensing and readout circuitry themselves and define the
category of the so-called smart-cameras-on-chip.
In this talk I will briefly talk about the AnaFocus experience and will refer to new opportunities which may
arise for technology transfer on CMOS imaging and more specifically on the use of CMOS single photon
avalanche diodes.

Summary

Oral or poster presentation

Oral

Presenter(s) : Prof. RODRÍGUEZ-VÁZQUEZ, Angel (AnaFocus Ltd. Universidad de Sevilla (Instituto de Microelectrónica de Sevilla – IMSE/CNM))