CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

IFIC
INSTITUT DE FÍSICA CORPUSCULAR

VNIVERSITAT DE VALÈNCIA

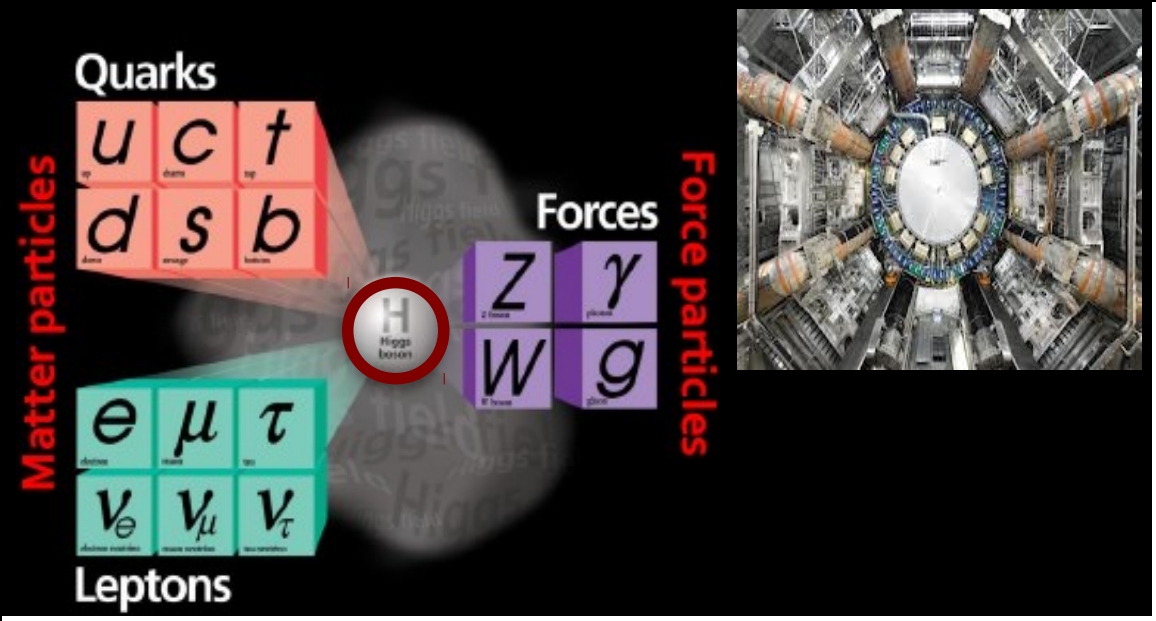
Actividades IFIC-TEO 2012
Universitat de València - CSIC

J W F Valle 20 Dic 2012

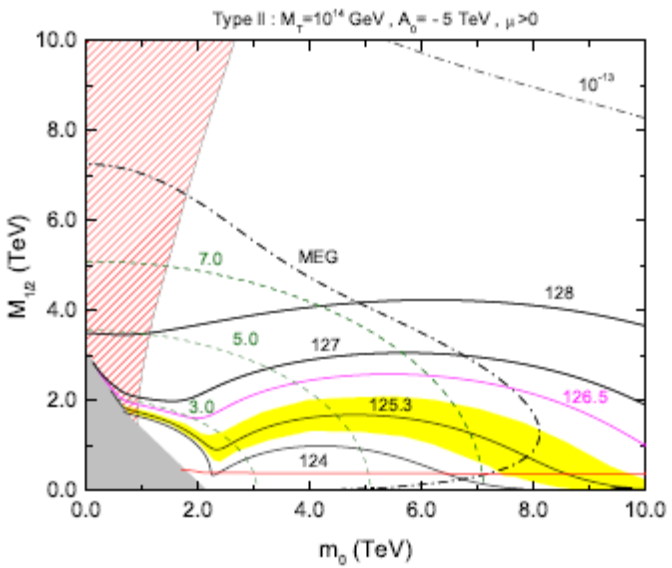
- **José Bernabéu** por la medalla de la Real Sociedad Española de Física.
- **Iván Agulló** por el premio de Jóvenes investigadores de la RSEF.
- **Vicente Vento** por el Premio de Investigación del Joint Institute of Nuclear Research.
- **José Navarro** por su nombramiento de Catedrático de Universidad.
- **José Adolfo de Azcárraga** por su nombramiento como miembro de la Comisión de expertos que diagnosticará el sistema universitario español y por su nombramiento de Profesor Emérito de la UVEG.
- **Vicente Giménez** por su nombramiento como Catedrático de Universidad.
- **Sergio Palomares** por su selección para representar a España en la LXII edición del *Lindau Meeting for Nobel Laureates*

DFT en el Programa de Seminarios (IVICFA) & Colloquia del IFIC

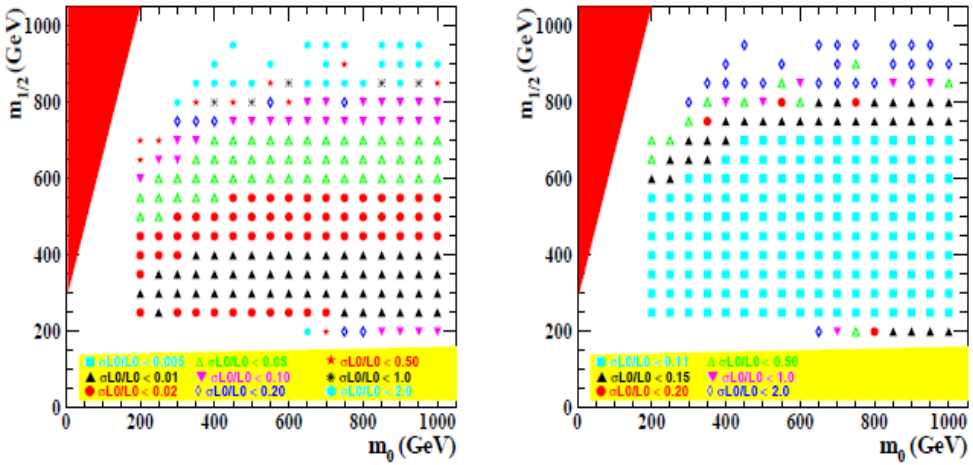
July 16th - 24th: DFT co-organized a school dedicated to the *Cosmic Microwave Background and High Energy Physics* at Instituto Astrofísica de Canarias in La Palma



JHEP 1211 (2012) 105



PRD86 (2012) 075001



⇒ Expected error in neutralino decay length measurement

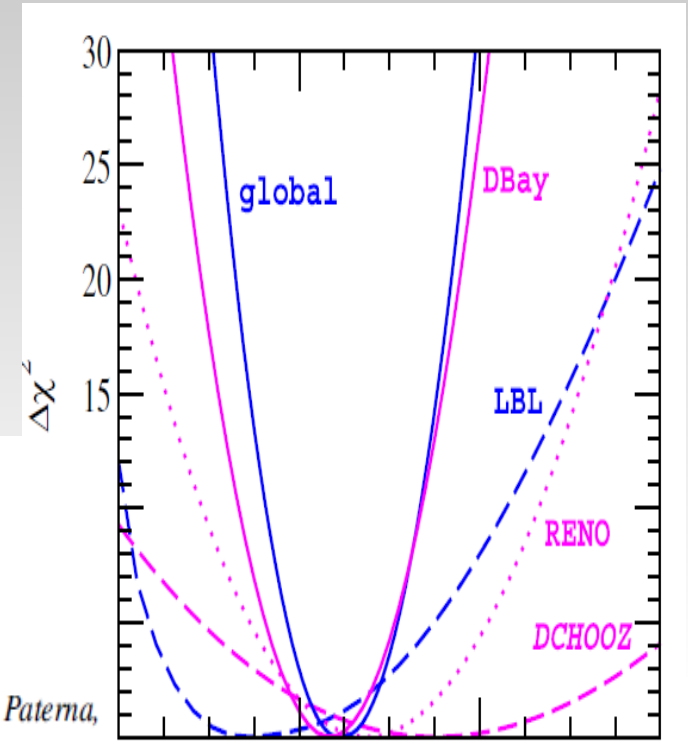
⇒ to the left: Without exp. error. To the right: Assumed 10 % syst. error

Constrained SUSY seesaws with a 125 GeV Higgs.
M. Hirsch, F.R. Joaquim, A.Vicente

De Campos, Eboli, et al
Probing Neutralino Properties in Minimal Supergravity with Bilinear R-Parity Violation

neutrino oscillation parameters





$\sin^2\theta_{13}$

$0.0246^{+0.0029}_{-0.0028}, \quad \Delta\chi^2 = 103.5 (10.2\sigma)$

122 inspire citations

PHYSICAL REVIEW D 86, 073012 (2012)

Global status of neutrino oscillation parameters after Neutrino-2012

D. V. Forero,* M. Tórtola,† and J. W. F. Valle‡

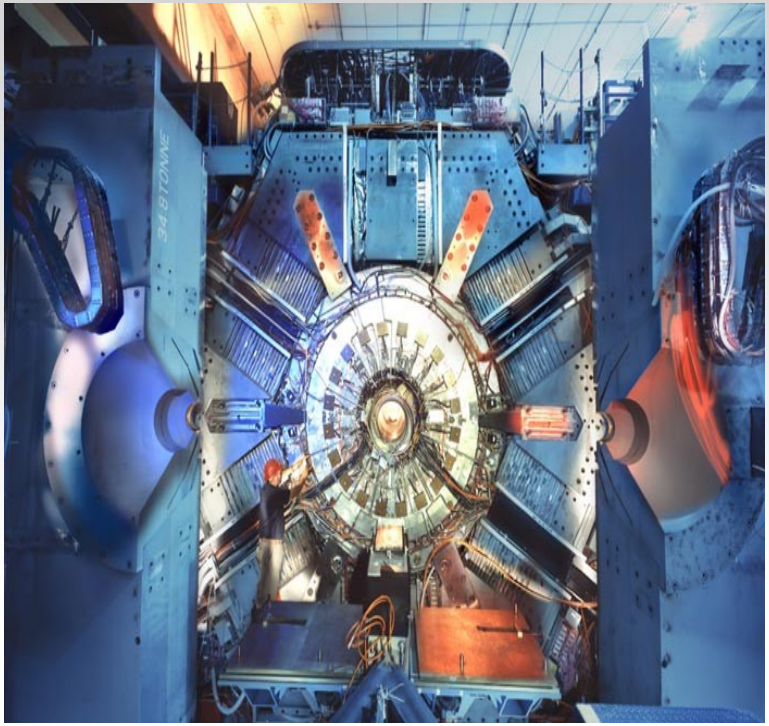
AHEP Group, Instituto de Física Corpuscular - C.S.I.C./Universitat de València Edificio de Institutos de Paterna, Apartado 22085, E-46071 València, Spain

(Received 18 May 2012; published 18 October 2012)

Here we update the global fit of neutrino oscillations in Refs. [T. Schwetz, M. Tortola, and J. W. F. Valle, New J. Phys. **13**, 063004 (2011); T. Schwetz, M. Tortola, and J. W. F. Valle, New J. Phys. **13**, 109401 (2011)] including the recent measurements of reactor antineutrino disappearance reported by the Double Chooz, Daya Bay, and RENO experiments, together with latest MINOS and T2K appearance and disappearance results, as presented at the Neutrino-2012 conference. We find that the preferred global fit value of θ_{13} is quite large: $\sin^2\theta_{13} \simeq 0.025$ for normal and inverted neutrino mass ordering, with $\theta_{13} = 0$ now excluded at more than 10σ. The impact of the new θ_{13} measurements over the other neutrino oscillation parameters is discussed as well as the role of the new long-baseline neutrino data and the atmospheric neutrino analysis in the determination of a non-maximal atmospheric angle θ_{23}.

DOI: 10.1103/PhysRevD.86.073012 PACS numbers: 14.60.Pq, 12.15.Ff, 13.15.+g, 26.65.+t

Time Reversal Violation for Entangled Neutral Mesons

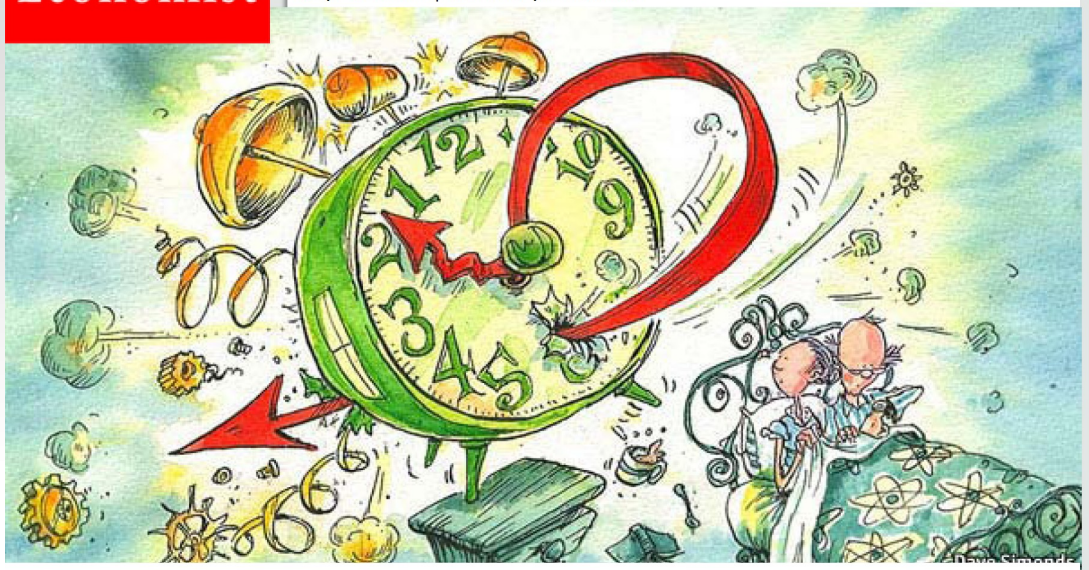


The Economist

The arrow of time

To the relief of physicists, time really does have a preferred direction

Sep 1st 2012 | from the print edition



TIME seems to flow inexorably in one direction. Superficially, that is because things deteriorate with age—

The BaBar collaboration has made the first direct observation of time-reversal (T) violation. The results are in agreement with the basic tenets of quantum field theory and reveal differences in the rates at which the quantum states of the B0 meson transform into one another. The researchers say that this measured lack of symmetry is statistically significant and consistent with indirect observations.

- METHOD, DEFINITE PROPOSAL & SIMULATION →
  J.B., F. Martínez-Vidal, P. Villanueva-Pérez, JHEP (2012)

- EXPERIMENTAL RESULT →
  BABAR Collaboration, PRL (2012),
  with View Point by Michael Zeller

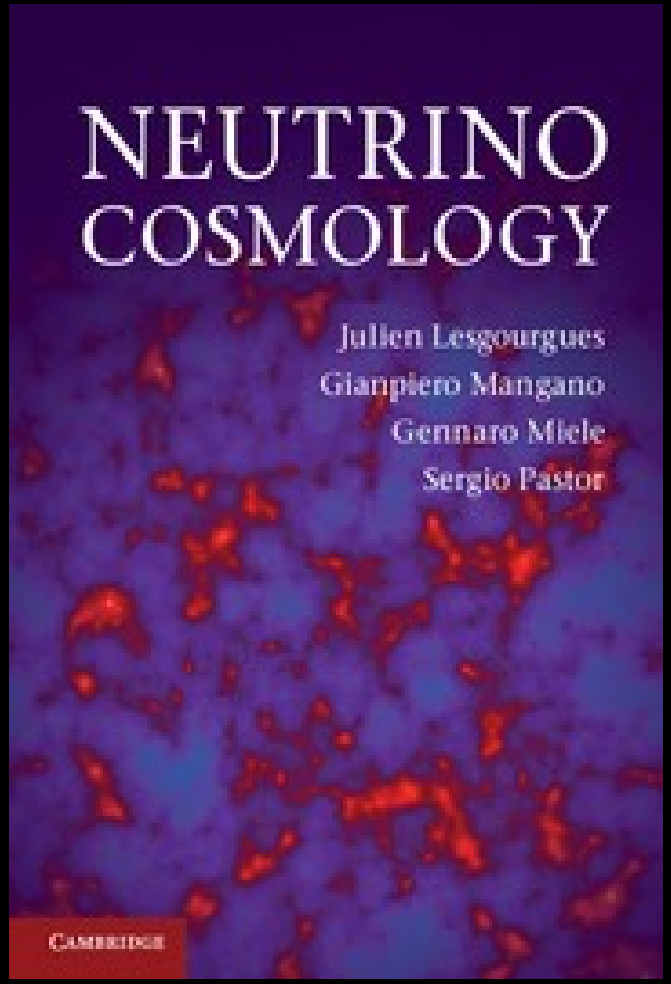
- For K's in Φ-Factory

- J.B., A. Di Domenico, P. Villanueva-Pérez, NPB (2012)

ASTROPARTICLES
Astroparticles and High Energy Physics Group

FPA2008-00319/FPA2011-22975
Lisbon, Naples, Torino, Würzburg ..

JWF Valle, M Hirsch, S Pastor, M Malinsky, E Peinado,
MA Tórtola, R Lineros, S Morisi, M Taoso*, U França, Laura Molina*
A Vicente*, L Reichert, C Arbelaez, S Boucenna, L Dorame, D Vanegas, V deRomeri



\+ many external colaborators

MULTIDARK CSD2009-00064
EU network **UNILHC PITN-GA-2009-237920 UNILHC 2009-2013**
Prometeo/2009/091TEO/2009/091

Journal of Cosmology and Astroparticle Physics
An IOP and SISSA journal

Cosmological radio emission induced by WIMP Dark Matter

N. Fornengo,[a,b] R. Lineros,[c,1] M. Regis[a,b] and M. Taoso[c,d,1]

LHCpheno

FPA2011-23778

Fenomenología de física de partículas en el LHC y las factorías de sabor

Investigadores del Grupo
Antonio Pich Zardoya
Grigorios Chachamis
Michal Deak
Lucia Hosekova
Jie Lu
Ioannis Malamos
Vicent Mateu Barreda
Xin-Qiang Li
Jorge Portolés Ibáñez
Germán V. Rodrigo García
Ignasi Rosell Escribà
Pedro D. Ruíz Femenía
Olga Shekhovtsova
Petros Draggiotis

Doctorandos
Sebastian Buchta
Alejandro Celis Alas
Alberto Filipuzzi **PhD**
Javier Fuentes Martín
Víctor Ilisie
Andrea Lami
Mehran Zahiri Abyaneh

Colaboradores externos
Vicenzo Cirigliano
Martín González Alonso

Redes Europeas
LHCPhenoNet (coordinador)

Coordinación del **CPAN:**
Centro Nacional
de Física de Partículas,
Astropartículas y Nuclear

PROMETEO/2008/069: Física del Large Hadron Collider: búsqueda de nuevas interacciones en la frontera de altas energías

- Phenomenology of Quantum Field Theories : Effective Field Theories, perturbative QCD
- Phenomenology of Electroweak Processes : Flavour Physics

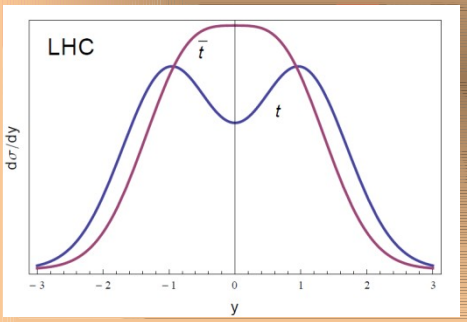
http://ific.uv.es/lhcpheno

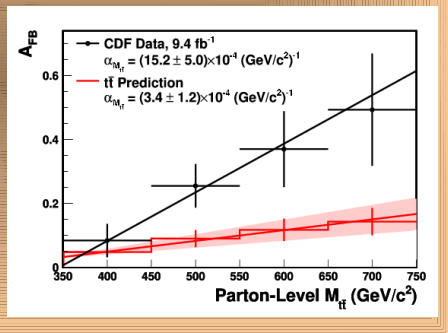
LHCPhenoNet Mid-Term Meeting

Auditorium Niemeyer
Ravello, Italy

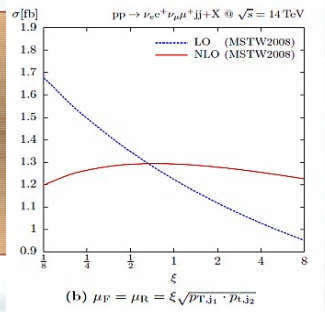
16|20 September 2012

Charge asymmetries of top quarks at hadron colliders revisited
J.H. Kühn, G. Rodrigo, JHEP 1201 (2012) 063
2nd most cited 2012 theory IFIC´s paper



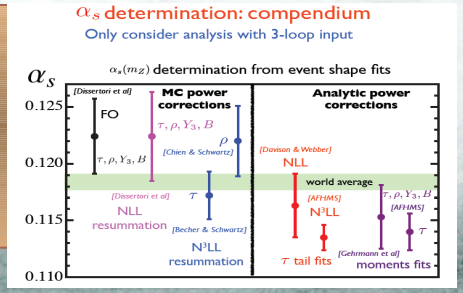


NLO QCD corrections to WWjj production in vector boson fusion at the LHC (Higgs bkgr)
A. Denner, L. Hosekova,
S. Kallweit, 1209.2389 (PRD)



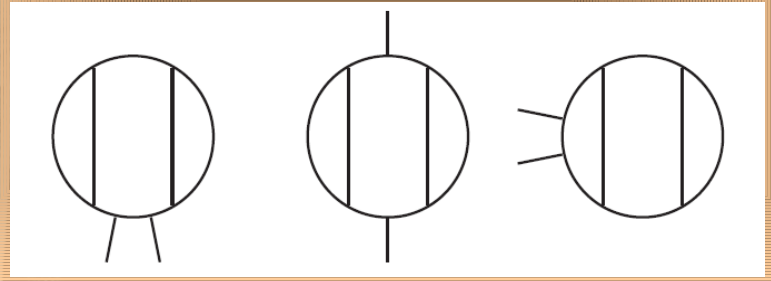
Space-like (versus time-like) collinear limits in QCD: Is factorization violated?, S. Catani,
D. de Florian, G.Rodrigo, JHEP 1207 (2012) 026

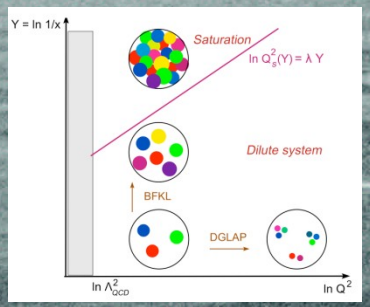
V. Mateu
at **LCWS12**
arXiv:1209.3781
and PRD86 (2012)
094002



Tree-Loop Duality Relation beyond simple poles,
I. Bierenbaum, S. Buchta, P. Draggiotis,
I. Malamos, G. Rodrigo, arXiv:1211.5048

Counting to One: Reducibility of Loop Amplitudes at the Integrand Level, R. Kleiss, I. Malamos,
C. Papadopoulos, arXiv:1206.4180





Forward physics (small-x)
M. Deák, arXiv:1209.6092
G. Chachamis
arXiv:1211.6332
and arXiv:1211.2050

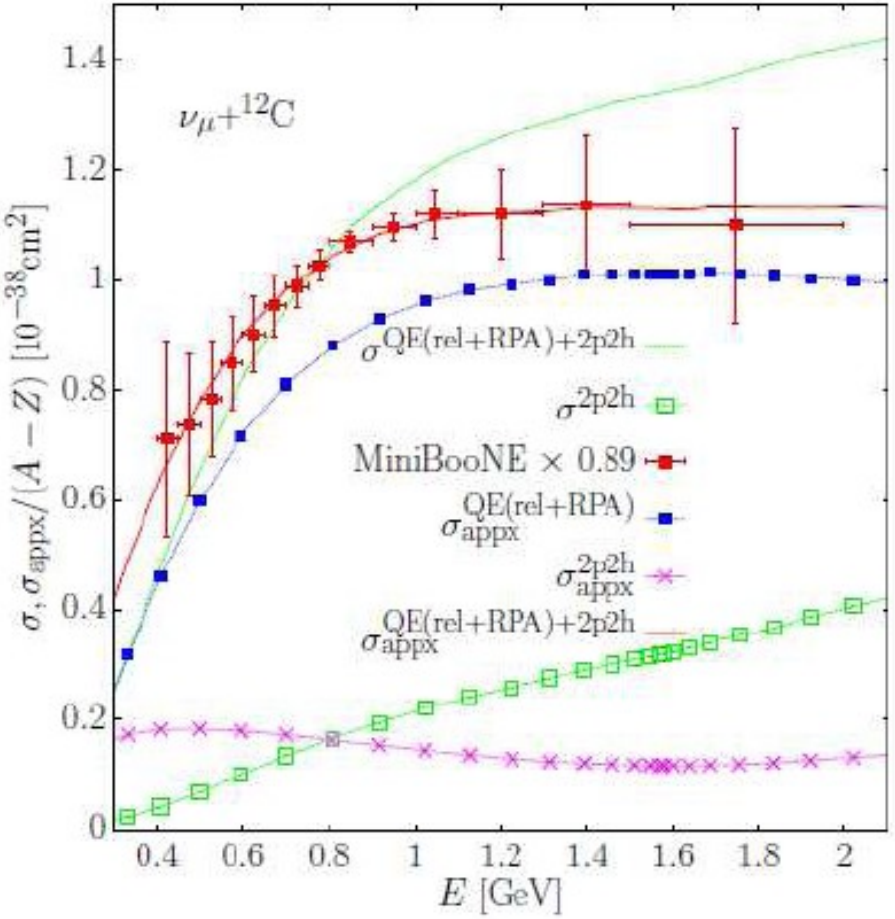
GRUPO FISICA NUCLEAR TEORICA @ IFIC

M. J. Vicente Vacas, J. Nieves, E. Oset
L. Alvarez Ruso , R&C
J. Garzon, C.W Xiao, En Wang, F. Aceti, C. Hidalgo, Becarios
Tim Ledwig, Postdoc,
Altug Ozpineci , Sabbatical

Neutrino nucleus interaction: Vicente, Nieves, Alvarez
Hadron properties with chiral perturbation theory: Vicente, Alvarez
Hadron interactions and resonances in effective field theories:
chiral unitary theory, hidden gauge, SU(N), heavy quark symmetries:
Nieves, Oset
Modification of hadron properties in nuclei: Nieves, Oset
Finite volume calculations: Oset

QE scattering on nuclei

- Impact on Eν reconstruction Nieves et al., PRD85 (2012)



Evaluation of neutrino Nucleus cross sections, considering the different Excitation mechanism of the nucleus. Comparison with MiniBooNE data.

- Because of multinucleon processes, the standard reconstruction algorithm does not work.

Física Hadrónica: Grupo de Modelos Quarks FPA2010-21750-C02-01

Funcionarios P. González, S. Noguera, V. Vento, J. Vijande
Contratados A. Pimikov (Postdoc), A. Martí (Predoc)

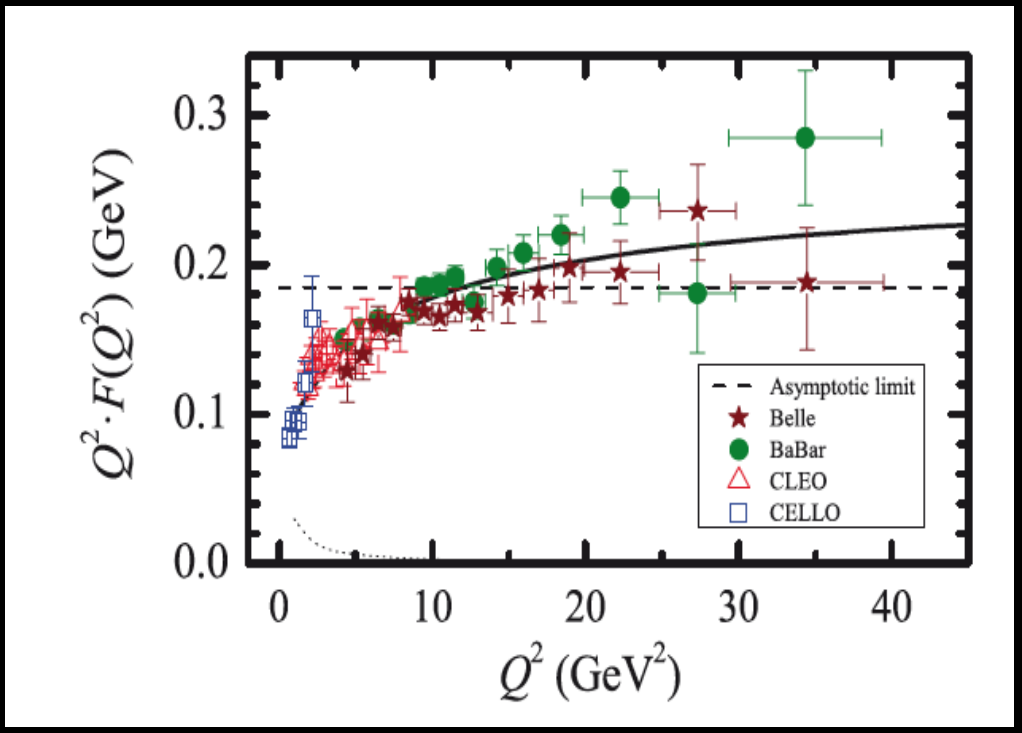
Líneas de Investigación

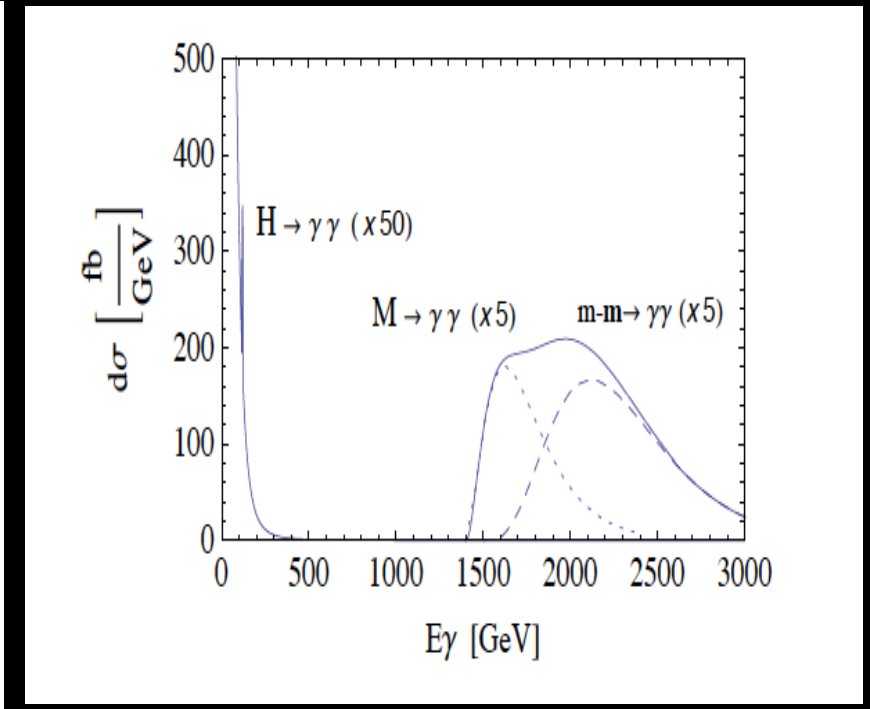
Espectroscopía hadrónica. Multiquarks.
Lagrangianos quirales no locales.
Dispersión profundamente inelástica (GPD, TDA).
Monopolium

Colaboraciones

U. Salamanca, U. Perugia, U. La Plata, Tandar, Dubna, U. Mons, U. Seoul, U. Chungnam, Saclay.

Factor de forma de transición del pion





"World data analysis" del factor de forma de transición del pión en el modelo Noguera- Vento .

Conclusión: evolución de QCD a partir de 1GeV explica los datos cualitativamente. La inclusión de higher twist effects a 1GeV permite una descripción cuantitativa.

Sección eficaz diferencial @ LHC a 2 fotones de la aniquilación monopolo-antimonopolo (masa monopolo 750 GeV) y de la del monopolium (masa 1400 GeV) (factor de escala 5) comparada con la del Higgs (factor de escala 50). Conclusión: para estas masas los monopolos deberían verse con luminosidad de 50-100 fb^-1.

- Vicent Giménez Gómez (Investigador principal)
- Arcadi Santamaría Luna
- Armando Pérez Cañellas
- Jorge Vidal Perona

+students

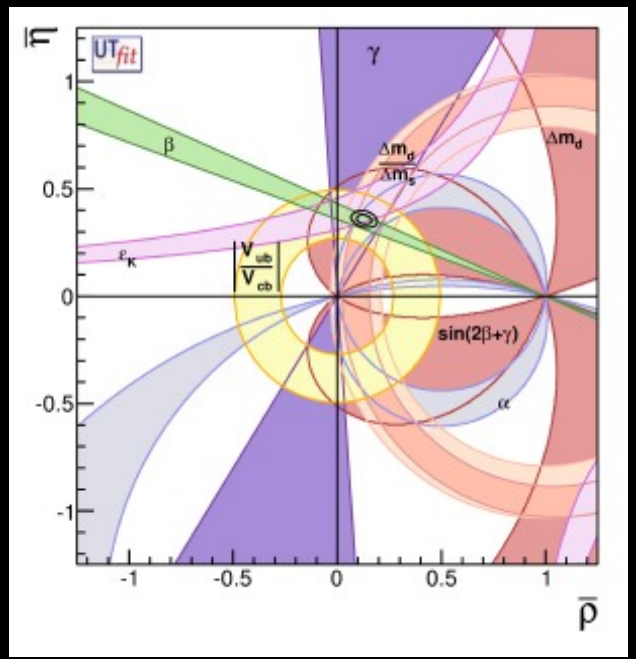
ValènciaPLQ
Particles, Lattices and Qbits

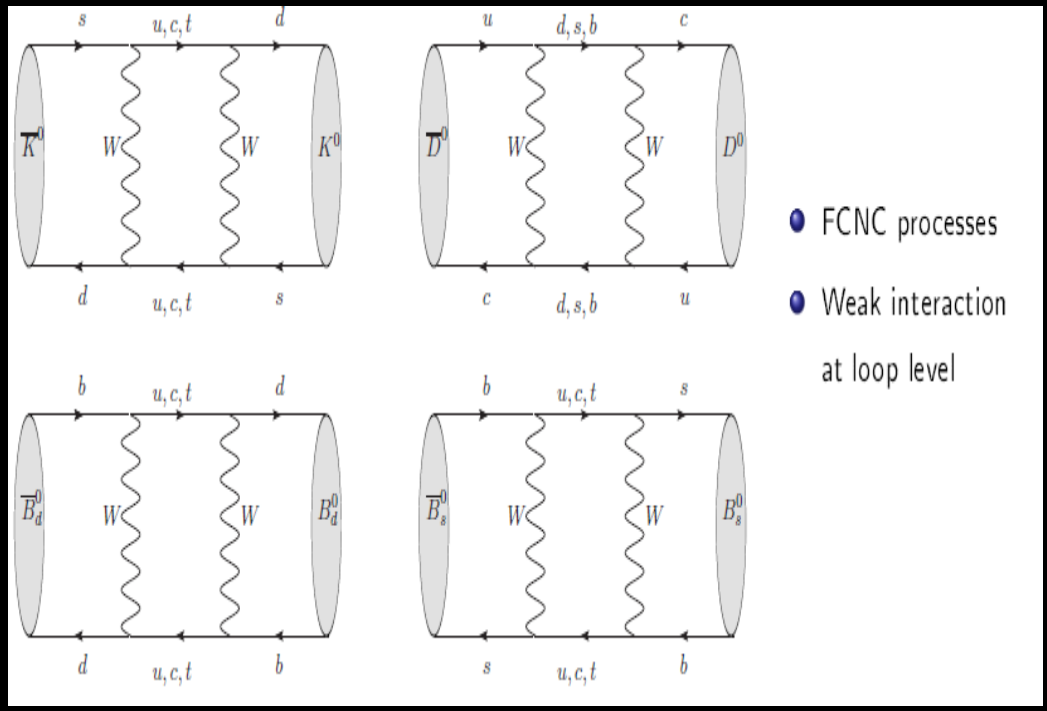
European Twisted Mass Collaboration

$K^0 - \overline{K}^0$, $D^0 - \overline{D}^0$ and $B^0 - \overline{B}^0$ oscillations from Twisted Mass Lattice QCD

Nuria Carrasco Vela

on behalf of the ETM collaboration





- FCNC processes
- Weak interaction at loop level

GEOMETRÍA, GRUPOS, TEORÍAS DE CAMPOS y SUPERSIMETRÍA

(título histórico desde 1978, FIS-2008-1980 (cuatro años, concluye el 31-Dic-12)

IP: J.A. de Azcárraga

Some research papers: [en **negrita** los **miembros** del proyecto]

J. A. de Azcárraga and J. M. Izquierdo, *(p,q) D=3 Poincaré supergravities from Lie algebra expansions,* Nucl. Phys. B **854**, (2012) 276 [arXiv:1107.2569 [hep-th]].

I.A. Bandos, J.A. de Azcárraga and C. Meliveo, *Conformal higher spin theory in extended tensorial superspace,* Fortsch. Phys. **60**, 861-867 (2012).

J. A. de Azcárraga, J. M. Izquierdo, J.Lukierski and M.Woronowicz, *Generalizations of Maxwell (super)algebras by the expansion method,* arXiv:1210.1117 [hep-th], to appear in Nucl. Phys. B

J.A. de Azcárraga, K. Kamimura and J.Lukierski, *Maxwell symmetries and some applications,* arXiv:1201.2850 [hep-th], Fortsr. Phys.xxx

J.A. de Azcárraga and J.M. Izquierdo, *k-Leibniz and n-Lie algebras: from Lie triple to Lie k-ple systems, in preparation.*

I. A. Bandos, C. Meliveo, *Three-form potential in (special) minimal supergravity superspace and supermembrane supercurrent,* J. Phys. Conf. Ser. **343,** 012012-1-16 (2012) [arXiv:1107.3232 [hep-th]].

D.~Roest and **O. Varela**, *The SU(3)-invariant sector of new maximal supergravity,* arXiv:1211.5335 [hep-th]

D. Cassani, P.Koerber and **O.Varela,** All homogeneous N=2 M-theory truncations with supersymmetric AdS4 vacua,' JHEP **1211**, (2012) 173 [arXiv:1208.1262 [hep-th]].

J.V.Rocha, M. J.Rodriguez and **O. Varela,** *An Electrically charged doubly spinning dipole black ring*, arXiv:1205.0527 [hep-th]

E. F. Borja, Iñaki Garay, F. Vidotto, *Learning about quantum gravity with a couple of nodes*, SIGMA **8**, (2012) 015 [arXiv:1110.3020[gr-qc]]

E. F. Borja, J. Díaz-Polo, I. Garay, *U(N) and holomorphic methods for LQG and Spin Foams*, arXiv:1110.4578 [gr-qc], to appear

E. F. Borja, J. Díaz-Polo, Laurent Freidel, I. Garay, E. R. Livine, *Dynamics for a simple graph using the U(N) framework for loop quantum gravity,* J. Phys. Conf. Ser. **60**, (2012) 012019 [arXiv:1110.6017[gr-qc]]

I. Agulló, J. Fernando Barbero G., **E. F. Borja**, J. Díaz-Polo and E.J.S. Villasenor, *Black hole entropy in loop quantum gravity*, J. Phys. Conf. Ser. **360**, (2012) 012035.

E. F. Borja, J. Díaz-Polo, L. Freidel, I. Garay and E. R. Livine, *New tools for Loop Quantum Gravity with applications to a simple model* AIP Conf. Proc. **1458** (2012) 339 [arXiv:1201.5470 [gr-qc]].

E. F. Borja, I. Garay and E. Strobel, *Revisiting the quantum scalar field in spherically symmetric quantum gravity*, Class. Quant. Grav **29**, (2012) 145012 [1201.4229 [gr-qc]].

I.A. Bandos, On pure spinor formalism for quantum superstring and spinor moving frame, arXiv:1207.7300 [hep-th].

I.A. Bandos, *Action for the eleven dimensional multiple M-wave system*, arXiv:1207.0728[hep-th].

I.A. Bandos and C. Meliveo, *Supermembrane interaction with dynamical D=4 N=1 supergravity. Superfield Lagrangian description and spacetime equations of motion*, JHEP 1208 (2012)140 [arXiv:1205.5885 [hep-th]].

I.A. Bandos,*Multiple M0-brane equations in eleven dimensional pp-wave superspace and BMN matrix model*, Phys. Rev. **D85**, 126005-1-13 (2012) [arXiv:1202.5501 [hep-th]].

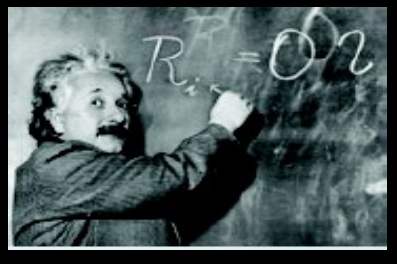
I.A. Bandos and C. Meliveo, *On supermembrane supercurrent and special minimal supergravity*, Fortschritte der Physik **60**, 868-874 (2012)

Artículos hechos por visitantes con mención al proyecto:

A. Cagnazzo, **D. Sorokin** and L. Wulff, *More on integrable structures of superstrings in AdS(4) x CP(3) and AdS(2) x S(2) x T(6) superbackgrounds*, JHEP {\bf 1201} (2012) 004 [arXiv:1111.4197 [hep-th]].

D. Sorokin, *Superstrings in AdS superbackgrounds and their integrability*, Phys. Part. Nucl. **43**, (2012) 583

plus the usual share of participation and organization [***Iberian Strings 2012***, Bilbao, Jan 31-Feb.2, 2012, I. Bandos] of conferences, workshops, popular science talks, etc. plus a number of other activities such as the writing, by a commission headed by the Vice-president of the RSEF [J.A. de A] of the ***RSEF Position Paper on Scientific Policy***.



MEMORIA (2012) DEL PROYECTO:
"AGUJEROS NEGROS CUANTICOS, SUPERGRAVEDAD Y COSMOLOGIA", IP: María Antonia L

MIEMBROS: A. Fabbri (RyC), M.A. Lledó (TU), J. Navarro-Salas, (CU), G. Olmo (JAE doc, IFIC), I. Agulló (Marie Curie Fellow, DAMTP, Cambridge, UK), F. Nadal (JAE), P. Galli (FPI)

- **Hawking radiation in acoustic black holes and white holes:**

- R. Balbinot, I. Carusotto, A. Fabbri, C. Mayoral and A. Recati, *Understanding Hawking radiation from simple models of atomic Bose-Einstein condensates*, arXiv1207.2660[gr-qc], Book chapter written for the book *Analog Gravity* (SIGRAV School, Como (Italy) 2011)
- A. Coutant, A. Fabbri, R. Parentani, R. Balbinot and P. Anderson, *Hawking radiation of massive modes and undulations*, *Phys. Rev. D86* (2012),064022
- A. Fabbri, *Les trous noirs rayonnent dans le laboratoire (Black holes radiate in the lab)*, artículo de divulgación, *La Recherche* **466** (2012), 69

-**Inflationary cosmology**

- I.Agullo, J. Navarro-Salas, and L.Parker, *Enhanced local-type inflationary trispectrum from a non-vacuum initial state*, JCAP **1205** (2012) 019
- I.Agullo and S.Shandera, *Large non-Gaussian Halo Bias from Single Field Inflation* JCAP **1209** (2012) 007
- I.Agullo, A.Ashtekar and W.Nelson, *A Quantum Gravity Extension of the Inflationary Scenario*, Phys. Rev. Lett. (2012)

-**Supergravity**

- D. Cervantes, R. Fioresi, M.A. Lledo,F. A. Nadal *Quadratic deformation of Minkowski space.* Fortsch.Phys. 60 (2012) 970-976. e-Print: arXiv:1207.1316 [hep-th]
- P. Galli, P. Meessen, T. Ortin *The Freudenthal gauge symmetry of the black holes of N=2,d=4 supergravity.* e-Print: arXiv:1211.7296 [hep-th]
- P. Galli, K. Goldstein, J. Perz *On anharmonic stabilisation equations for black holes.* arXiv:1211.7295 [hep-th]
- P. Galli, T. Ortin, J. Perz, C. S. Shahbazi. *Black hole solutions of N=2, d=4 supergravity with a quantum correction, in the H-FGK formalism.*e-Print: arXiv:1212.0303 [hep-th]

-**Cosmology, Nonsingular Black Holes, and Extended Theories of Gravity**

- G. J. Olmo, Book Editor: *Open Questions in Cosmology*, ISBN 978-953-51-0880-1, Publisher: InTech, December 2012.
- G. J. Olmo, Book chapter: *Introduction to Palatini theories of gravity and nonsingular cosmologies*, Published in *Open Questions in Cosmology*, ISBN 978-953-51-0880-1, Edited by: Gonzalo J. Olmo, Publisher: InTech, December 2012.
- G. J. Olmo, H. Sanchis-Alepuz and S. Tripathi, "Stellar Structure Equations in Extended Palatini Gravity," Phys. Rev. D **86**, 104039 (2012) [arXiv:1211.0692 [gr-qc]].
- S. Capozziello, T. Harko, T. S. Koivisto, F. S. N. Lobo and G. J. Olmo, "Wormholes supported by hybrid metric-Palatini gravity," arXiv:1209.5862 [gr-qc].
- J. Martinez-Asencio, G. J. Olmo and D. Rubiera-Garcia, "Black hole formation from a null fluid in extended Palatini gravity," Phys. Rev. D **86**, 104010 (2012) [arXiv:1209.3371 [gr-qc]].
- S. Capozziello, T. Harko, T. S. Koivisto, F. S. N. Lobo and G. J. Olmo, "Cosmology of hybrid metric-Palatini f(X)-gravity," arXiv:1209.2895 [gr-qc].

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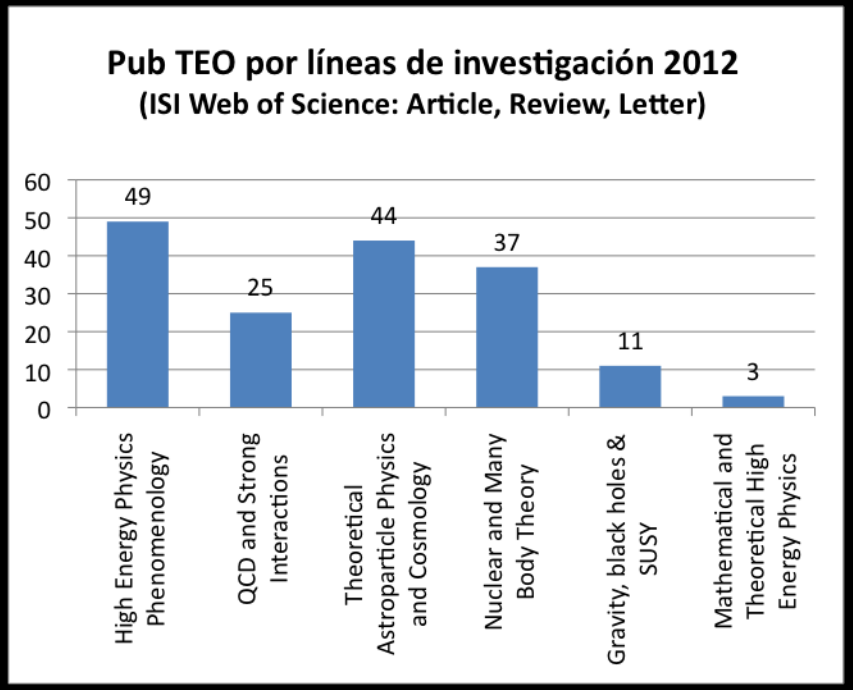

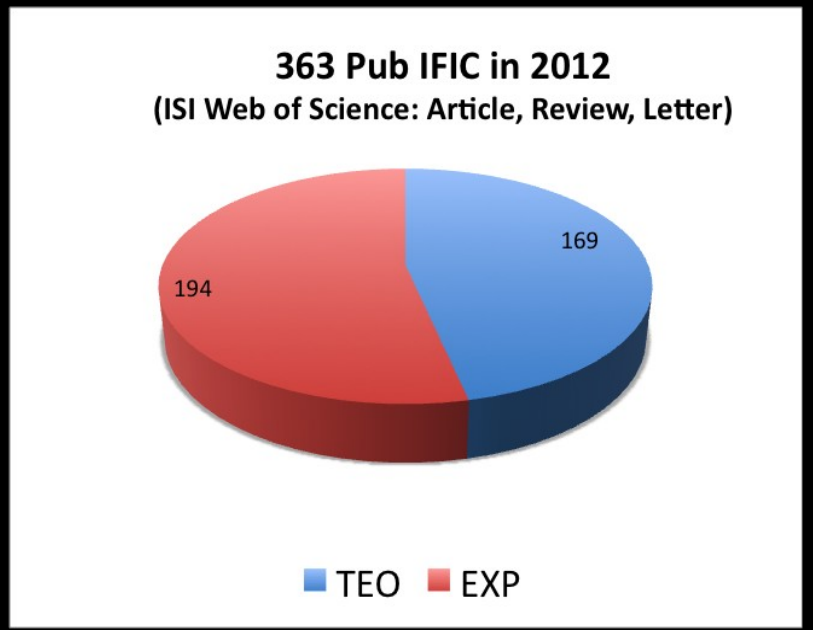

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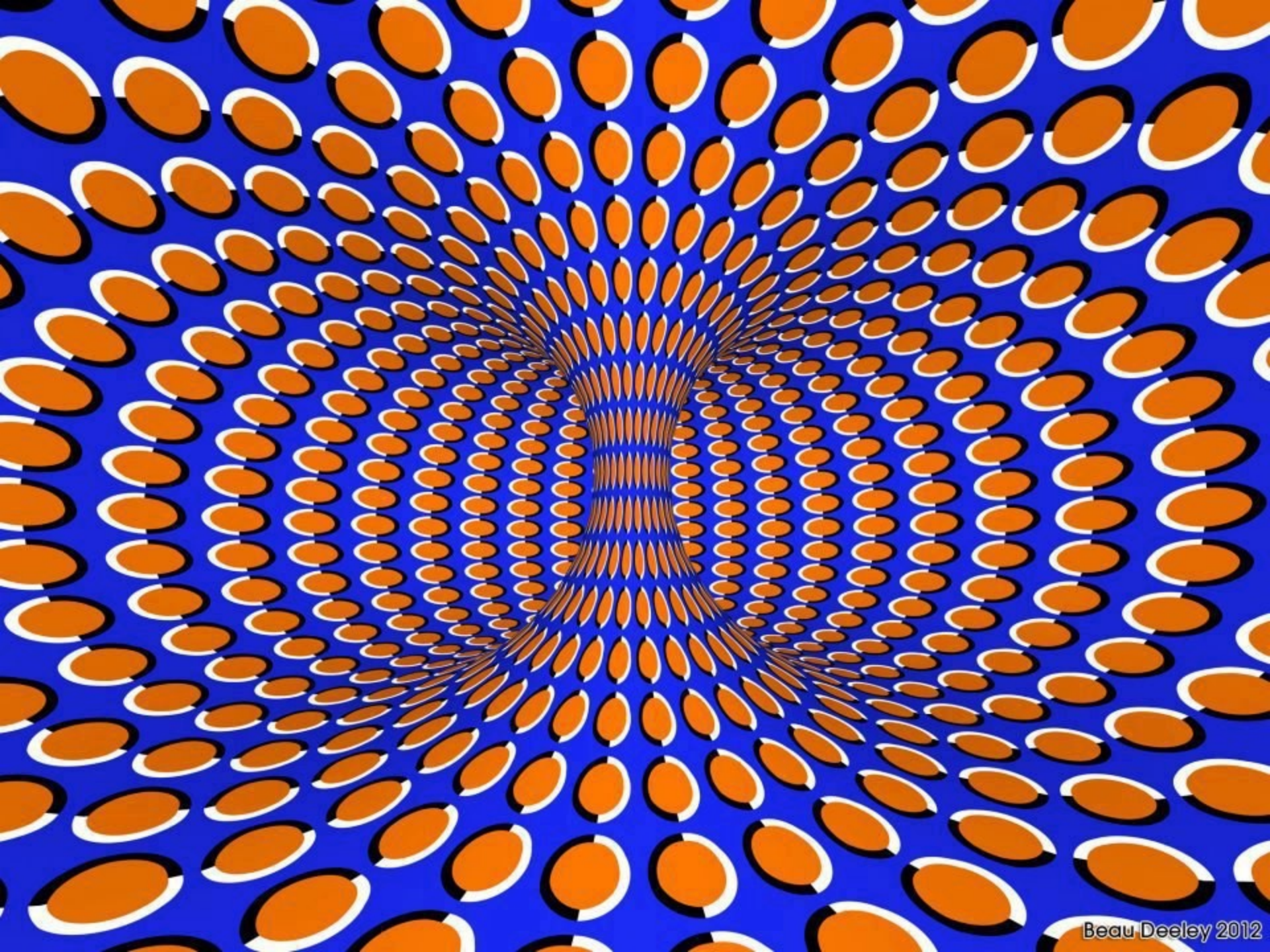
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