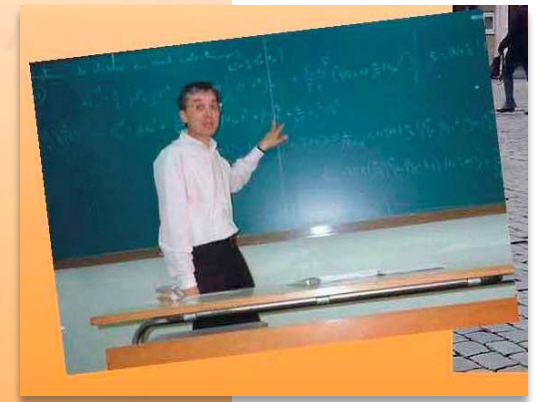


Santi 60



**"SYMMETRY BREAKINGS
IN A SYMMETRIC MIND"**

José Bernabén - IFIC 1ST July 2014

SURVIVOR FROM EL AAIÚN

➤ If The Party had provided the methodology of discipline, the banishment with the Militars in El Aaiún, not in the Islamic Mosque (Ufff!), completed the Symmetry of Santi's mind.



Mezquita junto a la plaza de la Marcha Verde



Puesto militar en El Aaiún

➤ He convinced me that it was worth giving him the opportunity of working a Ph. D. Thesis in Fundamental Physics.

PARITY VIOLATION I

- Polarization-Asymmetry Equality for Parity Violating Scattering

S. Noguera, J. Bernabeu (Valencia U.). May 1980. 8 pp.

Published in Phys.Lett. B95 (1980) 110

Print-80-0370 (VALENCIA)

- Rotational and T-Invariance

"ready for textbooks on Collision Theory"

$$\hat{u} = (\sin \mathcal{G} P_{in}^3 - \cos \mathcal{G} P_{in}^1, P_{in}^2, \sin \mathcal{G} P_{in}^1 + \cos \mathcal{G} P_{in}^3).$$

- Weak Interaction Of Quarks: Parity Violation In Neutron Nuclear Scattering

J. Bernabeu, S. Noguera (Valencia U.). 1981.

Published in In ***Trieste 1981, Proceedings, Nuclear Physics***,
755-763

PARITY VIOLATION II

➤ Parity Violation In Neutron Elastic Scattering Around Compound Nucleus Resonances

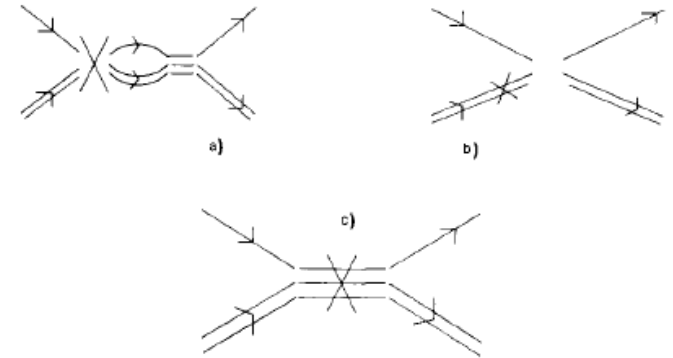
S. Noguera, J. Bernabeu (Valencia U.). 1983.
Published in Phys.Lett. B129 (1983) 125-129

➤ PNC effects in Tin isotope ^{117}Sn \leftrightarrow

Neutron Spin Rotation +
PNC Transmission Cross Section
In Elastic Scattering ?

Enhancement by Mechanism c)

of virtual excitation of Parity admixed compound nucleus state.



➤ Spin Dependence Of The Parity Nonconserving Neutron Nucleus Interaction

S. Noguera, J. Bernabeu (Valencia U.). 1984.
Published in Phys.Lett. B146 (1984) 427-430

Origin of the large observed PNC effects? Dependence of angular asymmetry for longitudinal and transverse polarizations

→ PARITY ADMIXED COMPOUND NUCLEUS STATE

DEFINITE ISOSPIN BREAKING $\Delta I=1/2$

➤ Hyperon Nonleptonic Decays And Baryon Structure

P. Gonzalez, S. Noguera, J. Bernabeu, V. Vento (Valencia U.). Aug 1983. 41 pp.

Published in Nucl.Phys. A423 (1984) 477 Print-83-0628 (VALENCIA)

➤ When I, not Santi, started in Physics, Weak Interactions had two empirical Selection Rules: $\Delta S = \Delta Q$ and $\Delta I = 1/2$. The first one was understood immediately around 1970 with Quark Model, the second is still there without complete understanding in 2014!

However, something is clear: it is originated in long distance physics and this was the motivation of this study in 1983,

associating the Selection Rule to Baryon Structure →

The Chiral Bag Model.

➤ Applied to PC and PV amplitudes for Λ decays --> Very sensitive to the Bag radius.

SPIN-ISOSPIN SU(4) BREAKING I

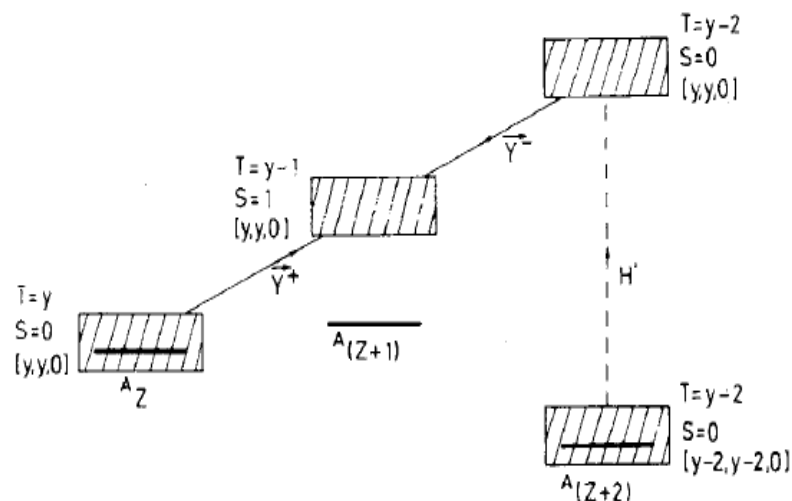
- Double Beta Decay And Its Connection To (n, p) Reaction On The Daughter Nucleus

J. Bernabeu, B. Desplanques, J. Navarro, S. Noguera (Orsay, IPN & Valencia U.)
Nov 1988. 13 pp. IPNO/TH-88-58, FTUV-88/20

- Double Beta Decay and SU(4) Symmetry

J. Bernabeu, B. Desplanques, J. Navarro,
S. Noguera (Valencia U.). Oct 1989. 21 pp.
Published in Z.Phys. C46 (1990) 323
IPNO/TH-89-55, IFIC/89-20, FTUV-89/34

- $2\nu \beta\beta$ decay is generated by the successive SU(4) generators of spin-isospin



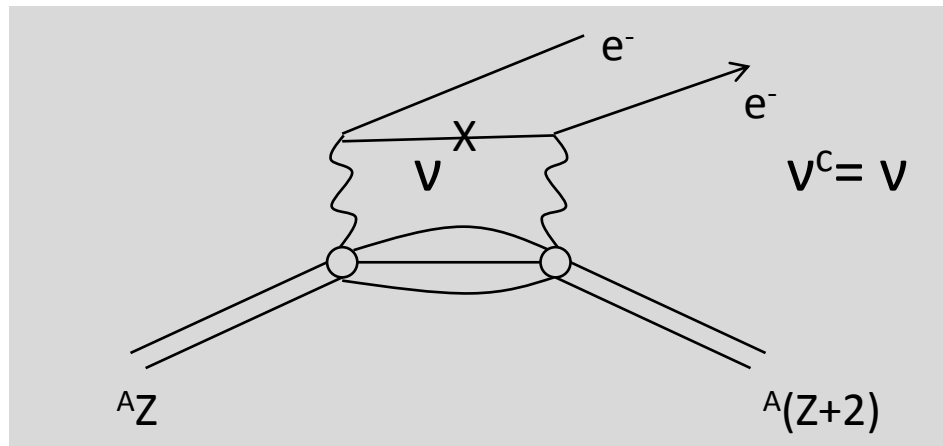
- The suppression of this process, and of the (n, p) reaction on the final state, is due to SU(4) breaking, because initial and final states are in different SU(4) supermultiplets. The result is obtained in first order perturbation theory for SU(4) breaking.

SPIN-ISOSPIN SU(4) BREAKING II

➤ Neutrinoless double beta decay in the SU(4) symmetry scheme
B. Desplanques (LPSC, Grenoble), S. Noguera, J. Bernabeu (Valencia U.). Mar 25, 1991. 13 pp.

Published in Z.Phys. C51 (1991) 499-502 FTUV-90-56, IFIC-90-53

➤ For neutrinoless double beta decay, the analysis is very different in the SU(4) scheme: The potential originated in Majorana neutrino exchange gives here a radial dependence in the transition operator, preventing to identify it with SU(4) generators!



POST-DOCTORAL GRENOBLE



The most important decision in Santi's life was the postdoctoral stay in the capital of the French Alps: GRENOBLE !



Hay momentos en la vida, como fué Grenoble para tí conociendo a Janine, que deberían tener la opción: "Guardar".

Disfruta, Santi, la vida con tu familia otros 60 años!!!