

FAPESP



^{64}Cu : Experimental and Theoretical Study

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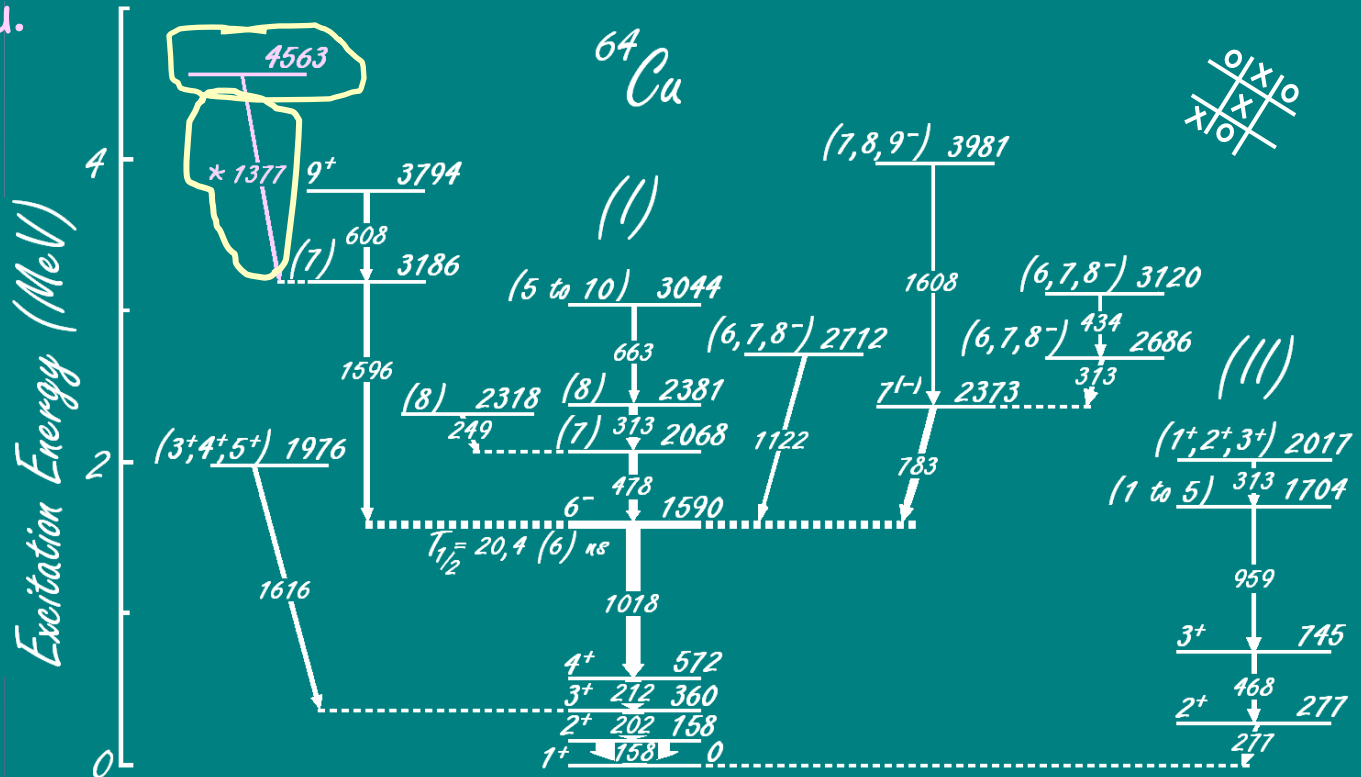
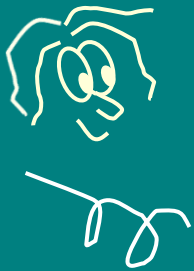
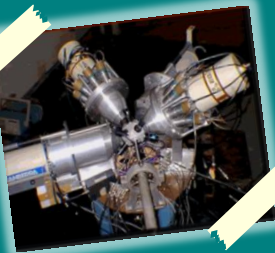
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The Experiment: Study of ^{64}Cu Nuclear Structure

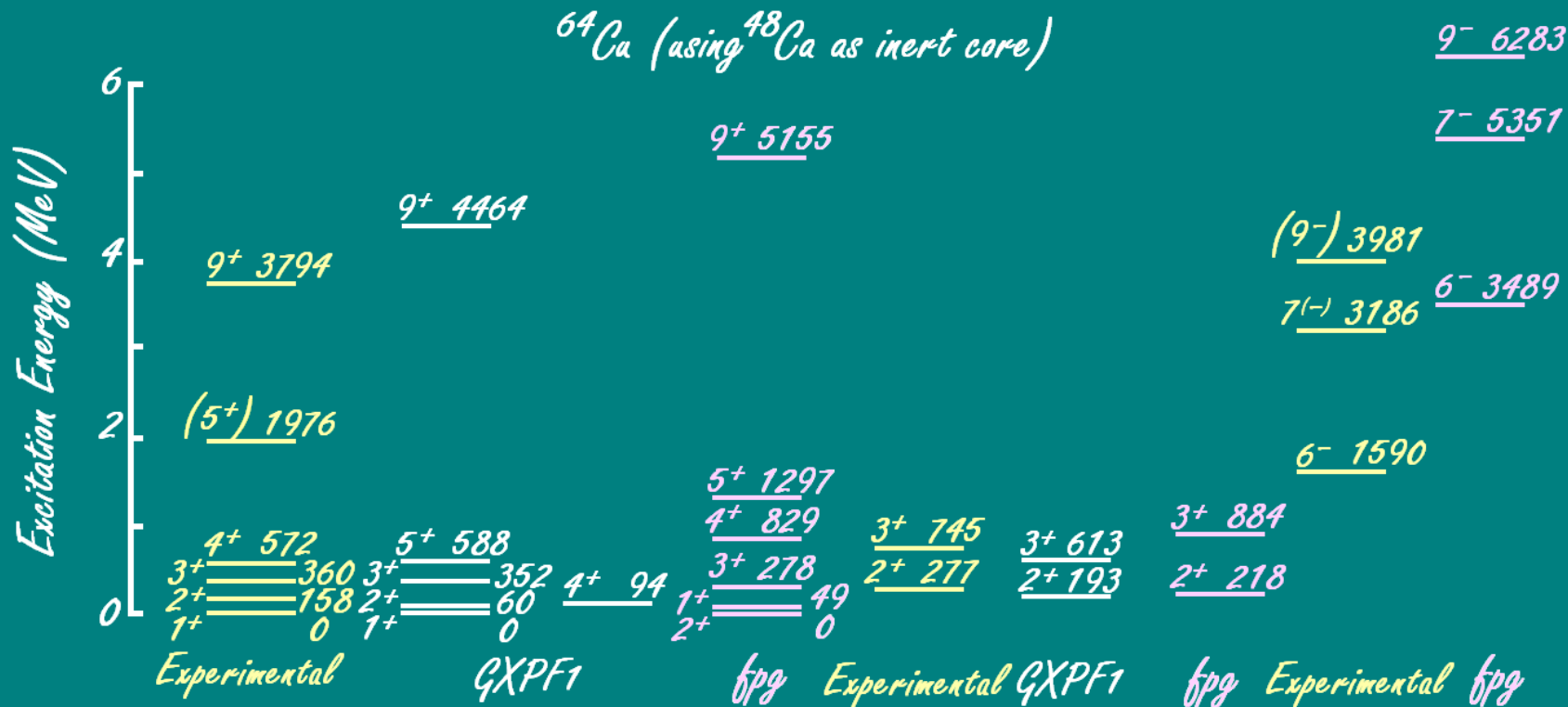
- fusion-evaporation reaction $^{51}\text{V}(^{16}\text{O}, 2p)^{64}\text{Cu}$ at 70 MeV beam energy.
- SACI-PERERE γ -ray spectrometer [1]: 4 Compton-suppressed GeHP and 11 phoswich scintillator ΔE -E telescopes.
- 10 new gamma-rays and one new state have been assigned to ^{64}Cu .
- Due to low statistics, only one transition could be placed in the known level scheme of ^{64}Cu .



[1] J. A. Alcántara-Núñez et al., Nucl. Inst. Meth. A 497, 429 (2003).

Comparison Between the Experiment and the Large Scale Shell Model Predictions

- Antoine Code [2], using GXPF1 [3] and fpg [4,5] effective interactions.
- Two inert cores to describe ^{64}Cu : $^{40,48}\text{Ca}$.



[2] E. Caurier and F. Nowacki, Acta Phys. Polonica B 30, 705 (1999).

[3] M. Honma et al., Phys. Rev. C 65, 061301 (2002).

[4] O. Sorlin et al., Phys. Rev. Lett. 88, 092501 (2002).

[5] F. Nowacki, Ph.D. thesis, IReS, Strasbourg, France (1996).



Conclusions

- Necessity of doing another experiment to include the new transitions found in the level scheme.
- Positive parity states: better described using the GXPF1 and ^{40}Ca . These assumptions, however, do not reproduce the groundstate spin.
- Negative parity states: *fpg* only. ^{40}Ca : good agreement with the experimental energies.
- The results obtained with the LSSM have shown that the ^{64}Cu excited states could be described by particle-hole excitations and these states are characterized by wave functions with large mixture of configurations.

