SIGNATURES OF THE GIANT PAIRING VIBRATION IN THE ^{14}C AND ^{15}C NUCLEI

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Giant resonances are collective excitation modes for many-body systems of fermions governed by a mean field, such as the atomic nuclei. The microscopic origin of such modes is the coherence among elementary particle-hole excitations, where a particle is promoted from an occupied state below the Fermi level (hole) to an empty one above the Fermi level (particle).
The same coherence is also predicted for the particle–particle and the hole–hole excitations, because of the basic quantum symmetry between particles and holes. In nuclear physics, the giant modes have been widely reported for the particle–hole sector but, despite several attempts, there is no precedent in the particle–particle and hole–hole ones, thus making questionable the aforementioned symmetry assumption. The Giant Pairing Vibration (GPV) is the leading particle–particle giant mode.

Recently we have provided the first experimental signature of the GPV in light nuclei ^{14}C and ^{15}C excited by the two-neutron transfer reaction (^{18}O,^{16}O) at 84 MeV incident energy. These results, recently published in ref.[1], will be presented and discussed.

[1] F. Cappuzzello, et al., Nat. Commun. 6:6743 doi: 10.1038/ncomms7743 (2015).