Contribution ID: **37** Type: **Oral**

Double Gamow-Teller transition of Ca-48 and its relation to neutrinoless double-beta decay

Tuesday, 17 October 2017 14:30 (20 minutes)

We study the double Gamow-Teller (DGT) transition of Ca-48 with state-of-the-art nuclear shell model calculations, including up to two harmonic oscillator shells (sd and pf shells). An analysis of the sensitivity of the DGT strength distribution with respect to nuclear correlations shows that the centroid energy of the DGT giant resonance depends mostly on the isovector pairing interaction, while the resonance width is more sensitive to isoscalar pairing. Pairing correlations are also known to be key to determine the nuclear matrix element of neutrinoless double-beta (0nbb) decay. We find a simple relation between the centroid energy and width of the DGT giant resonance and the value of the Ca-48 0nbb decay matrix element. In addition we observe a very good linear correlation between the 0nbb decay matrix element and the DGT transition to the ground state of the final nucleus, Ti-48. This correlation holds in general for pf-shell nuclei and extends to an energy-density functional calculation. Our theoretical results suggest that DGT experiments on Ca-48 and other nuclei can be a very valuable tool to constrain the value of 0nbb decay nuclear matrix elements.

Primary authors: Dr MENENDEZ, Javier (Center for Nuclear Study, University of Tokyo); YAKO, Ken (Center for Nuclear Study, University of Tokyo); SHIMIZU, Noritaka (Center for Nuclear Study, University of Tokyo)

Presenter: Dr MENENDEZ, Javier (Center for Nuclear Study, University of Tokyo)

Session Classification: Parallel