

## Nuclear Double Gamow-Teller Responses – little known aspects of nuclear structure –

*Saturday, 30 June 2018 14:00 (30 minutes)*

In a long history of nuclear physics, double Gamow-Teller responses have been hardly studied, at least experimentally. Existing data include half-lives of only ~10 double beta nuclei. This exhibits a striking contrast to the case of single Gamow-Teller responses where data of half-lives exist for more than 2000 nuclides together with cross section data of charge exchange reactions.

One possible way to access double Gamow-Teller responses in nuclei other than double beta-decay ones and to the excited states is to use double charge exchange reactions. However, previous attempts with pion and heavy-ion double charge exchange reactions provided us with limited information.

We started a new experimental program to investigate double Gamow-Teller responses in a wide excitation energy range with a newly invented experimental method to use the ( $^{12}\text{C}, ^{12}\text{Be}\gamma$ ) reaction. One of the highlight of the program is a discovery of the double Gamow-Teller giant resonances that exhaust a major part of the sum-rule value. The first experiment was carried out with a 100-MeV  $^{12}\text{C}$  beam at Research Center for Nuclear Physics (RCNP), Osaka University. We have found indication of the double Gamow-Teller giant resonances in  $^{48}\text{Ca}$  which is among double beta-decay nuclei. We plan high-statistics experiments with a high intensity  $^{12}\text{C}$  beam at RI Beam Factory (RIBF) which will be scheduled in 2019.

In the symposium, I will present results of the RCNP experiment and show future plans at RIBF, after brief introduction to nuclear double Gamow-Teller responses and its relevances to double beta-decay physics.

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