RCNP COREnet Program Report on
Gamma-Decay from Pygmy and Giant Dipole Resonances

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Participants

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Period of research

From July 2019 to March 2021

Main location of collaboration implementation

Univ. of Milano/INFN and RCNP

Publication list including any kinds of papers, talks and so on

No journal paper is published yet.

Talks

- A. Bracco, *Isospin effects and the electric dipole response in nuclei*, 7th Workshop on Nuclear Level Density and Gamma Strength, Oslo May 27-31 2019.
- F. Crespi, *Gamma decay of pygmy states in ^{90,94}Zr from inelastic scattering of light ions*, African Nuclear Physics Conference (ANPC2019), Kruger National Park, South Africa, July 1-5, 2019
- A. Tamii, *Electric Dipole Response Studied by Proton Scattering*, African Nuclear Physics Conference (ANPC2019), Kruger National Park, South Africa, July 1-5, 2019
- A. Tamii, *Gamma decay of the isovector giant dipole resonance in ^{90}Zr: damping mechanism and fine structure*, International Nuclear Physics Conference (INPC2019), Glasgow July 29 - August 2, 2019.
- N. Kobayashi et al., *Study of low-lying E1 excited states of ^{208}Pb via coincidence measurement of inelastic scattering of 80-MeV protons and γ decay*, International Nuclear Physics Conference (INPC2019), Glasgow, July 29 - August 2, 2019.
- A. Tamii, *Electromagnetic Response of Nuclei Studied by Proton Scattering*, 9th Int. Symp. on Nuclear Symmetry Energy (NuSYM2019), Da Nang, September 30 - October 4, 2019

- A. Tamii, *Gamma Decay of the Isovector Giant Dipole Resonance in ^{90}Zr*, Vth Topical Workshop on Modern Aspects in Nuclear Structure -- The Many Facets of Nuclear Structure, Bormio, 4 - 9 February 2020

Description of the outputs

The structure of pygmy dipole resonances (PDR) and the damping mechanism of the isovector giant dipole resonances (IVGDR) are studied by light-ion scattering excitation and gamma-decay coincidence measurements. The research items to be explored within the scope of this COREnet program is two-hold. 1) The electric dipole strength in ^{90}Zr and ^{94}Zr were probed in the PDR region by proton and alpha scattering to study their strength distribution, isospin-structure, and the surface nature. 2) The width of IVGDR relevant spreading and damping mechanism of IVGDRs is studied by measuring its gamma decay to the ground state.

The core members, A. Bracco, F. Camera, F. Crespi, A. Tamii and P. von Neumann-Cosel except N. Kobayashi got together in Milano two times, in November 2019 and in January 2020. Each time we had concentrated productive discussion of 2-3 days. The data analysis on the research topic 1) has been almost finalized for publication. Interpretation of data, figures, and the main ingredients of the publication has been discussions. Different excitation cross-section distributions between proton and alpha scattering and the surface nature of the PDR in ^{90,94}Zr will be one of the key ingredients. The preliminary results on the research topic 2) has been discussed for refinement of the data and physics interpretations for publication. The GDR strength is planned be decomposed into pre-equilibrium and compound decay components by the experimental data. By using the chance, publication on the electric dipole polarizability in tin isotopes has been discussed. The paper has just been submitted for publication. After the meetings we are having delay of research progress than expected due to the novel corona virus problem.