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Nuclear spin-isospin responses studied by nuclear reactions: A tribute to Munetake Ichimura

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Progress in the nuclear spin physics studied by nuclear reactions is briefly reviewed with particular emphasis on the contributions of Munetake Ichimura and his research-group.

Much of his recent work was based on a comprehensive framework consisting of a distorted wave impulse approximation (DWIA) with response function calculated by a continuum random phase approximation (RPA). We pay special attention to two contrasting problems.

One is the quenching of the total Gamow-Teller (GT) transition strength with respect to the model-independent GT sum rule (Ikeda's sum rule).

The other is the enhancement of the pionic modes at relative large momentum transfers as a precursor phenomenon of pion condensation.

A main aim of this review is to gain an overall understanding of the behavior of these spin-isospin modes.

Furthermore, recent developments in the isospin dependence of the spin-isospin residual interaction studied by the GT resonances for unstable nuclei as well as the tensor correlation effects observed in the spin-dipole resonances are also addressed.

Primary author: WAKASA, Tomotsugu (Kyushu University)

Presenter: WAKASA, Tomotsugu (Kyushu University)

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