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Proton-neutron tensor correlation studied by measuring spin-M1 strengths in self-conjugate even-even nuclei

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We have measured spin-M1 strength distributions in stable self-conjugate even-even nuclei by measuring proton inelastic scattering at 295 MeV at forward angles. The target nuclei are 12C, 16O, 20Ne, 24Mg, 28Si, 32S, 36Ar, 40Ca.

Each of isoscalar and isovector spin-M1 strengths were summed up to the excitation energy of 16 MeV. The summed strengths were divided by the square of the bare isoscalar and isovector g-factors, respectively, and the ratios of the isoscalar to the isovector strengths were obtained. The experimental result showed a nearly constant value of ~1.5, while shell model calculations predicted a nearly constant value of 1. The value of 1 corresponds to the case when the sums of the square of the nuclear matrix elements, M(sigma) and M(sigma tau), are the same. Thus the experimental data for M(sigma) are systematically larger than M(sigma tau).

The result may be closely related to p-n tensor correlation effect in the ground states. I will report on the work.

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