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Study of low-lying E1 excited states of ^{208}Pb via the $(p,p'\gamma)$ reaction

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The Pygmy Dipole Resonance (PDR) is one of the hottest topics in the recent nuclear physics and is generally interpreted as the anti-phase oscillation of the excess neutron skin and core. On the other hand, some theoretical studies suggest that the conventional interpretation may not be complete, and the full description of the PDR is still under debate. For instance, Inakura et al. pointed out that the valence neutrons with low orbital angular momenta play important roles in the strength of the PDR.

In this context, we performed an experimental study of low-lying electric dipole states of ^{208}Pb via $(p,p'\gamma)$ reactions at $E_p = 80$ MeV. This experiment is one of the studies undertaken as part of the CAGRA+GR campaign at RCNP, Osaka University. CAGRA stands for Clover Array Gamma-ray spectrometer at RCNP/RIBF for Advanced research, and the array was constituted by 12 clovers borrowed from Argonne National Laboratory in the US, the CCDC/Army Research Laboratory in the US, the Institute of Modern Physics in China, and Tohoku University in Japan. The angular differential cross sections in the range of 3.5-11.5 degrees were measured in coincidence with gamma rays emitted from the inelastically excited states. The non-interacted beam on the target was guided to the wall dump by the newly constructed Grand Raiden forward-mode beam line (GRAF). In the presentation, we discuss the preliminary results of the measurement and other results of the CAGRA+GR campaign collaboration.

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