

## High-resolution study of dipole excitations in $^{208}\text{Pb}$ with polarized proton scattering at $0^\circ$ \*

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At the angles close to  $0^\circ$  one can study dipole modes which apart from the isovector giant dipole resonance, are poorly understood. Recent experimental progress at RCNP Osaka, Japan [1], allows measurements of intermediate-energy polarized inelastic proton scattering at very forward angles including  $0^\circ$  combined with high energy resolution of the order  $\Delta E/E \approx 8 \cdot 10^{-6}$ . This new experimental opportunity was applied to a study of soft electric dipole modes, such as Pygmy Dipole Resonance (PDR) and the so-called toroidal mode. The preliminary data analysis indicates that at very forward angles  $1^-$  states are strongly excited via Coulomb interaction. The semiclassical treatment of the Coulomb excitation probability allows to extract  $B(E1)$  transition strengths which are in a good agreement with data obtained from a nuclear resonance fluorescence experiment [2]. First results of the data analysis will be presented.

### References

- [1] A. Tamii et al., Nucl. Phys. A 788 (2007) 53c.
- [2] N. Ryezayeva et al., Phys. Rev. Lett. 89, 272502 (2002).

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**Topic:** Nuclear structure

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