

Exploring Hyperfine-Structures of many-electron ions using laser spectroscopy

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The study of hyperfine structures in many-electron highly charged ions (HCIs) can provide a deeper understanding of strongly correlated electrons and serve as a benchmark for advanced theoretical calculations. Additionally, the possibility of using HCIs as atomic clock candidates emphasizes the importance of hyperfine structures in many-electron HCIs [1]. However, there has been limited progress in hyperfine spectroscopy of many-electron HCIs due to experimental challenges. We successfully performed hyperfine-structure resolved laser spectroscopy of HCIs in an electron beam ion trap plasma. In the meeting, we present the hyperfine structures in the $4d95s1$ metastable states of Pd-like $127I7+$ by laser-induced fluorescence (LIF) spectroscopy of magnetic-dipole (M1) transitions along with the detailed modeling and theoretical hyperfine structure calculations [2].

1. Kozlov M et al 2018 Rev. Mod. Phys. 90 045005
2. Kimura, N., Priti, Kono, Y. et al. 2023 Commun Phys 6, 8.

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