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Polarized atoms in a far-off-resonance YAG laser optical dipole trap FANG FANG, Los Alamos National Lab, HAIYAN WANG, DAVID FELDBAUM, DAVID VIEIRA, XINXIN ZHAO, Los Alamos National Lab — Optical trapping of radioactive atoms has a great potential in precision measurements for testing fundamental physics such as electric dipole moment (EDM), atomic parity non-conservation (PNC) and parity violating beta-decay correlation coefficients. One challenge that remains is to polarize the atoms to a high degree and to measure the polarization of the sample and its evolution over time. In this paper we report on the polarization study of Rb atoms in a yttrium-aluminum-garnett (YAG) laser optical dipole trap using both Faraday rotation polarimetry and resolved Zeeman spectroscopy techniques. We have prepared a cold cloud of polarized atoms and observed that its spin relaxation due to light scattering is suppressed in the YAG dipole trap. The spin polarization is further purified and maintained when the two-body collision loss rate between atoms in mixed spin states is greater than the one-body trap loss. These advancements are an important step towards a new generation of precision measurement with polarized trapped atoms.

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