Abstract Submitted
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Investigation of xenon metastable atoms[1] TIAN XIA, YUAN-YU JAU, WILLIAM HAPPER, Princeton University, HAPPER LAB TEAM — The electron configuration of a xenon atom in its metastable state consists of tightly bound core electrons with a single missing electron in the 5P shell, and a loosely bound "valence electron" in the 6S shell. For our current work, we have been using pyrex cells with internal tungsten electrodes, filled with isotopically enriched Xe129 gas. Ti-sapphire laser is used to pump the metastable atom from $6S_2$ to $6P_2$and $6P_3$at 823nm and 882nm respectively. The absorption spectrum is able to resolve the hyperfine structure of Xe129 in $6S_2$, $6P_2$and $6P_3$ state. The hyperfine coefficients for $6S_2$, $6P_2$agree with previously reported measurements. And the hyperfine coefficient for $6P_3$state has not been reported before. If the pumping wavelength is locked at any one of the hyperfine transitions of Xenon129 atom, zero-field magnetic resonances of metastable Xenon atoms could be observed by pumping with circularly polarized laser beam. Since relaxation between magnetic sublevels is very fast due to the big depolarization collisional cross section, the linewidth of the magnetic resonant signal is broad.

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Tian Xia
Princeton University

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