

Abstract Submitted  
for the DAMOP10 Meeting of  
The American Physical Society

**Towards Laser trapping of Argon-39 - A Spectroscopic Study of the Metastable Cycling Transition at 811.8 nm** WILLIAM WILLIAMS, Physics Div, Argonne National Lab, ZHENG-TIAN LU, KENNETH RUDINGER, CHENYU XU, Physics Div, Argonne National Lab and Dept of Physics, Univ of Chicago, REIKA YOKOCHI, Dept of Earth & Environ. Sciences, Univ of Illinois, PETER MUELLER, Physics Div, Argonne National Lab — Phase-modulation saturation spectroscopy is performed on an enriched radioactive Ar-39 sample. The spectrum of the metastable cycling transition at 811.8 nm is recorded, and its isotope shift between Ar-39 and Ar-40 is derived. The hyperfine coupling constants A and B for both the lower and upper states of the transition are also determined. Atomic structure information of this transition is needed in order to implement Atom Trap Trace Analysis (ATTA) of this rare isotope for applications in the earth sciences. This work is supported by DOE, Office of Nuclear Physics under contract No. DE-AC02-06CH11357.

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Date submitted: 25 Jan 2010

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