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Weak interaction studies with laser trapped ^{6}He ARNAUD LEREDDE, PETER MUELLER, Argonne National Lab, YELENA BAGDASAROVA, ALEJANDRO GARCIA, RAN HONG, MATTHEW STERNBERG, DEREK STORM, ERIK SWANSON, FREDERIK WAUTERS, DAVID ZUMWALT, University of Washington, XAVIER FLECHARD, ETIENNE LIENARD, LPC-CAEN, OSCAR NAVILIAT-CUNCIC, Michigan State University — ^{6}He beta decay is an interesting case to test the nature of the weak interaction through the precise measurement of the beta-neutrino angular correlation parameter a. According to the Standard Model, its pure Gamow-Teller decay should be ruled by an axial-vector interaction only, which leads to $a = -1/3$. Any deviation to this value would indicate new physics beyond the Standard Model. The high precision goal of this experiment, $\Delta a/a = 0.1\%$, requires a large statistic along with small and well known systematic errors. To satisfy these constraints, ^{6}He atoms are trapped in a magneto-optical trap (MOT) which allows observation of the decay products with minimal perturbations. The setup is optimized to have a high capture efficiency, a low background and a high detection efficiency. ^{6}He ($T_{1/2}$ =807 ms) is produced on-line through the ^{7}Li(d,^{3}He)^{6}He nuclear reaction. The ^{6}He atoms are then loaded into a first MOT via a Zeeman slower. Subsequently, they are pushed toward a second MOT chamber dedicated to the decay detection. a is obtained by detecting the ^{6}Li$^+$ recoiling ions in coincidence with the beta particle. The details of the setup and preliminary results will be presented. This work is supported by DOE, Office of Nuclear Physics, under contract nos. DE-AC02-06CH11357 and DE-FG02-97ER41020.

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