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Weak Interaction Studies with ^{6}He[1]

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The CENPA laboratory at the University of Washington has recently developed the world's most intense source of ^{6}He. With the aid of this new source the ^{6}He half-life has been measured with high accuracy, solving a long standing experimental discrepancy and illuminating issues regarding the renormalization of the axial coupling constant in the nuclear medium. Recent advancements in ab-initio nuclear-structure calculations were crucial in the interpretation of the data for this light nucleus. The ^{6}He source -delivering about 10^{10} atoms per second- makes possible a planned search for a signature of new physics called "tensor currents" to unprecedented precision. The tensor currents would be revealed either in the correlation between the direction of emission of the electron and the neutrino or in the shape of the beta spectrum in the decay of 6He. Laser trapping is being developed to be used for producing an ideal source for precise measurements. In this talk we will describe the source developments, the determination of the 6He half-life, the recent laser-trapping improvements, and the prospects for the future measurements.

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