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Neon MOT experiment for Beta-decay studies

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In this talk, I will review the current status and future outlook of NeAT - the Neon Atom Trap Setup at the Hebrew university. We are developing a highly efficient atomic trap setup for different isotopes of metastable neon for the purpose of conducting high precision experiments in atomic and nuclear physics. Modern experiments with neutral atoms trapped using modern laser-cooling techniques offer the promise of improving several broad classes of experiments with radioactive isotopes [1]. For nuclear beta-decay, precise measurements of the kinematic correlations between the emitted positron and neutrino test the standard model of the weak interaction [2]. These correlations are sensitive to scalar- and tensor-current interactions which are suggested by some beyond standard model theories [3], and high statistics measurements of them put strict limitations on their parameter space.

[1] J.A. Behr, Nucl. Instr. and Meth. in Phys. Research Section B: Beam Interactions with Materials and Atoms 204, 526 (2003).

[2] J.A. Behr and G. Gwinner, Journal of Physics G: Nucl. and Part. Phys. (2009).

[3] N. Severijns, M. Beck, and O. Naviliat-Cuncic, Rev. Mod. Phys. 78, 991 (2006).

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