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Towards a radioactive-beam trapping experiments in Israel

The standard model of particle physics provides a good description of almost all known particle physics processes. Despite its successes, the standard model is known to be incomplete since, for example, some of its parameters are arbitrary and are derived from experiment rather than a priori.
New physics beyond the standard model tests becomes one of the major interests in recent years. Lately, most known experiments to test for physics beyond the standard model are being developed in the ultra-high energy regime (e.g. LHC), which probes directly new physics processes. A second class of experiments searches for the effects of new physics at lower energies by performing precise measurements of observables, which are calculable from the standard model, and attributing any variation to new physics. Recent years have seen a plethora of such experimental proposals in general, that make use of existing accelerator facilities (e.g., the JLab Qweak and PREx proposals) as well as experiments which borrow techniques from Nuclear, Atomic, Molecular, and Optical (AMO) physics. The present work is in the context of measurements of correlation coefficients in the beta decay of radioactive nuclei.
We discuss the plans of performing such high precision measurements at the Weizmann Institute, using a high-flux d+t neutron generator to produce 6He and 8Li by (alpha, n) reactions. This in turn will lead to experiments at the upcoming 40 MeV, 2 mA, proton and deuteron SARAF accelerator in Israel. The SARAF accelerator will provide record yields of light radioactive beams (such as 8Li and 6He), of O(10ˆ12) atoms/sec. The talk will address the present R&D efforts toward this goal and discuss possible collaborations with ongoing RIB trapping programs. Of particular emphasis is the novel use of an Electrostatic Ion Beam Trap (EIBT) for such measurements. These traps were first built and used at the Weizmann Institute and are currently being extensively used in atomic and molecular physics experiments, but have not yet been utilized for trapping of radioactive ions. The proposed scheme may offer numerous advantages over other techniques.
In this talk we present the conceptual design of such a scheme and preliminary simulations.

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