Abstract Submitted
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TRINAT apparatus for measurements of correlations from the beta decay of magneto-optically trapped polarized alkali atoms[1] ALEXANDRE GORELOV, J.A. BEHR, L. KURCHANINOV, K. OLCHANSKI, S. SMALE, TRIUMF, S. BEHLING, D. MELCONIAN, B. FENKER, M. MEHLMAN, P.D. SHILDING, Texas A&M University, M. ANHOLM, U. British Columbia, D. ASHERY, Tel Aviv University, G. GWINNER, U. Manitoba, TRINAT COLLABORATION — Measurements of correlations from beta decay of highly polarized atoms from MOT requires a fast transition between trapping and polarization/measurement cycles to reduce an unwanted expansion of decaying atoms. To achieve this, we have developed an apparatus employing AC MOT, which required placing high-current and low-inductance coils of magnetic quadrupole inside the stainless steel vacuum vessel and allowed us to reduce a time gap between trapping and measurement cycles (the quadrupole magnetic field in the trap region has to become less than 50mG) to less than 100μs. The nuclear detection system consists of an electrostatic spectrometer of recoiling ions and shake-off electrons with MCP based detectors in back-to-back geometry as well as two scintillator based $\beta-$telescopes, normal to the MCP-MCP axis. This system allowed us to successfully measure the beta asymmetry in the β^+ decay of polarized ^{37}K atoms with significantly reduced backgrounds. Time-varying magnetic field from the AC MOT and stationary guiding electric field allowed us to probe the energy distribution of the shakeoff electrons in the range 5$-$30eV.

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