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Beta-neutrino correlations from the beta decay of optically trapped ^{38m}K atoms A. GORELOV, D. MELCONIAN, M. TRINCZEK, Simon Fraser U., W.P. ALFORD, U. Western Ontario, J.A. BEHR, P.G. BRICAULT, M. DOMBSKY, K.P. JACKSON, TRIUMF, D. ASHERY, Tel Aviv U., F. GLUCK, U. Mainz — The $\beta-\nu$ correlation parameter, a, has been measured in the $0^+ \to 0^+$ beta decay of trapped ^{38m}K (lifetime 0.924s) atoms to place limits on the possible contribution of a scalar interaction to nuclear beta decay [A.Gorelov et al., PRL, **94**, 142501(2005)]. A magneto-optical trap provides an isomerically selected and backing-free source of atoms, localized in a volume less than 1mm in diameter, so the low-energy recoiling nuclei can freely escape and be detected in coincidence with betas in back-to-back geometry. The $\beta-\nu$ correlation is measured by observing the positron in a $\Delta E - E$ telescope and the time of flight of the recoiling Ar nucleus in a micro-channel plate (MCP). The application of a uniform electric field along the detection axis toward the MCP allows separation in time of the Ar^0, Ar^+ and higher charge states of Ar ions as well as increasing both their collection and detection efficiencies. Analysis of about 160,000 events with the positron energy above 2.5 MeV (1/2 the $Q-$value) resulted in the $\beta-\nu$ correlation parameter $\tilde{a} = 0.9981 \pm 0.0030^{+0.0032}_{-0.0037}$, consistent with the Standard Model prediction $\tilde{a} = 1$. Future modifications of the experimental apparatus and data analysis may give us a possibility to reduce systematic errors and extend the search to lower beta energies.

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