



EINLADUNG

zum

VERA - SEMINAR

von

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Time modulation of entangled two-body weak decays with massive neutrinos

We have studied in the Experimental Storage Ring (ESR) at GSI Darmstadt, the time development of the orbital electron capture decays of H-like ^{140}Pr , ^{142}Pm , and ^{122}I ions and found that the electron capture rate is not purely exponential but in addition time modulated with periods of $T= 7.06(8)$ s, $7.10(22)$ s and $6.11(3)$ s for ^{140}Pr , ^{142}Pm and ^{122}I , respectively. The modulation amplitude is $a= 0.20(3)$ in the average for all three decays. Such modulation periods correspond to small energy differences of 8.6×10^{-16} eV, and 7.5×10^{-16} eV, respectively, for a quantum beat type phenomenon. We attribute this phenomenon to lepton entanglement of mixed massive electron neutrinos emitted in the two-body weak decays with squared mass difference $\Delta m^2 = 2.20(3) \times 10^{-4}$ eV². This is about 2.9 times larger than latest value reported by the KamLAND antineutrino oscillation experiment.

Donnerstag, 5. März 2009, 16:30 Uhr

**1090 Wien, Währinger Str. 17, "Kavalierstrakt",
1. Stock, Victor-Franz-Hess-Hörsaal**