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INTERNAL BREMSSTRAHLUNG IN ^{7}Be AND ^{37}Ar

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From the viewpoint of weak interactions, the electron capture decay mode of the nucleus is certainly the least studied. Experimentally also, studies are rare: e.g. only one measurement of parity violation in this weak process has been reported, viz. in ^{119}Sb. Theory predicted an energy independent asymmetry since the emitted photons are totally relativistic at all energies. Higher order calculations showed that this statement does not hold at energies below $Z\alpha mc^2$, as was found indeed by W. Brewer in the case of ^{119}Sb. Few cases lend themselves to parity violation study because of the low intensity of the continuous photon spectrum compared to normal γ-emission (about 10^{-4}). In practice only ground state to ground state allowed transitions can be used therefore. Another limit at higher energies exists, i.e. $E_0 < 2mc^2$, since positron emission starts to compete. In ^{37}Ar both Z and E_0 are low enough to expect an almost energy independent asymmetry of the IB spectrum.

The ^{37}Ar, produced at Isolde and measured in the NICOLE facility, was oriented in Fe at temperatures down to 5mK. Anisotropies of the order of 5% were recorded using 3 Ge detectors at 0°, 90° and 180° relative to an external magnetic field.

Contrary to theoretical predictions we still detected an energy dependence of nearly 30% in function of energy from 150 to about 700 keV (end point energy 814 keV). Further analysis and new measurements are planned to check whether the effect is instrumental (e.g. scattering) or corresponds to still incomplete theoretical description. The case of ^{7}Be has been investigated both experimentally and theoretically as a result of this study (no relativistic corrections).