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Nuclear **I**mplantation into **C**old **O**n **L**ine **E**quipment

Proposal for on line nuclear orientation on ISOLDE-3

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SUMMARY

Low temperature nuclear orientation of isotope-separator implanted short-lived radioisotopes makes possible the measurement of nuclear magnetic dipole and electric quadrupole moments of oriented ground and excited states with half-lives longer than a few seconds, and the evaluation of level-schemes and multipole mixing ratios in the decay of daughter nuclei. Coupling schemes characterising the odd nucleons and ground-state deformations can be extracted from the nuclear moments. The high sensitivity of the method enables to search for weakly fed intruder states in daughter nuclei.

After implantation of the primary ion beam, nuclear orientation may be applied to the study of the decay products ; in many cases these are either far from volatile themselves, or form beams of ions inappropriate for laser-spectroscopy. Nuclear orientation is thus complementary to the facilities existing at ISOLDE for nuclear moment measurements. Decay scheme parameters are deduced from anisotropies measured in singles. This aspect is complementary to other techniques of nuclear spectroscopy with unique sensitivity to weak transitions.

As for a first serie of investigations we propose the Pt → Ir → Os → Re → W decay chain, obtained from the decay of primary Hg-beam. In these nuclei prolate-oblate shape transitions are predicted which switch between prolate (lighter) and oblate (heavier) isotopes with an equilibrium quadrupole deformation of the ordre of $\beta \sim \pm 0.15$. In platinum isotopes this shape-transition is expected at about A 185 mass-number, in Ir and Os it is at the neutron-rich side. For platinum direct quadrupole moment determinations are planned ; for Ir and Os the shape transition region cannot be atteined with actual ISOLDE-beams, but the unnatural ground state configurations ($I \neq K$), observed already in ^{186}Ir and ^{193}Os in off-line nuclear orientation can be explored by simultaneous determination of μ and Q.