

## 6. Mean square charge radius investigations by in-source laser ionization method at the ISOLDE facility

Shape coexistence at low excitation energy in nuclei is a phenomenon for which interest has been continuously growing on both the experimental and theoretical. The region around the closed proton shell  $Z = 82$  is especially prolific. The mean square charge radii and electromagnetic moments of the neutron-deficient  $^{182-190}\text{Pb}$  isotopes have been studied at ISOLDE facility (CERN, Switzerland) under experiment is407 using the same technique proposed at IRIS (PNPI) and with participation of specialists from IRIS laboratory. Combination of the laser ion source method with the high efficient alpha-detection technique was proved to be successful down to the very short-lived  $^{182}\text{Pb}$  isotope ( $T_{1/2}=55$  ms) with a count rate as low as a few ions per second.

In the previous experiments for Hg isotopes the staggering odd-even effect was observed for mean square charge radii near  $N=104$ . Comparison of measured change of mean square charge radii for Pb isotopes with the Hg data has demonstrated smooth behaviour of the Pb isotopic dependence in contrast with Hg one. It means the spherical form of neutron deficient Pb nuclei and the mean square charge radii changes are very sensitive to the low-lying deformed state wavefunction admixtures.

The longest isotopic chain of Po isotopes has been measured using the resonance ionization spectroscopy in laser ion source (IS456). The mean square charge radii changes and electromagnetic moments have been obtained for  $^{191-216}\text{Po}$ . Preliminary results demonstrate significant increasing of nuclear deformation starting from around  $N=115$  to far from beta-stability line.

( For more information see [IS407\\_Pb.pdf](#) or [IS456\\_Po.pdf](#) )