Electron spectrometer – status an perspectives

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The designed and constructed at the **U**niversity of **L**odz an **e**lectron **s**p**e**ctrometer (ULESE) [1] for "in-beam" measurements is characterized by high efficiency up to 12 % at energy of 300 keV, good energy resolution < 1 % at 1 MeV and, importantly good suppression of delta electrons, positrons and photons emitted by the targets. This achievement was obtained using a combination of magnetic field in two different layouts: perpendicular and parallel to the axis of the spectrometer being orthogonal to the beam line.

The conversion-electron spectrometer coupled to the EAGLE array [2] was successfully used in the measurements at HIL UW. Main goal of the performed experiments was study of the problem of the K selection rule violation for electromagnetic transitions in nuclei. This phenomenon in spite of being a subject of extensive investigations, is still actual problem [3,4]. Coincidence gamma-electron measurements allowed to determine internal conversion coefficients and, in consequence absolute probability transitions descent from of the $I^{\pi} = K^{\pi} = 8^{-}$ isomeric state in nuclei with number of neutrons 74 (^{130}Ba,^{132}Ce, ^{134}Nd) and N=106 (^{184}Pt) [5,6]. We are going to continue research in this subject by study of the K isomers observed in super heavy nuclei.

Additionally, we are going to start the new project of study of the shape coexistence phenomena by using the ULESE spectrometer and the EAGLE gamma array. It appears that, low-lying excited 0^{+} states are always associated with shape coexistence [7] and usually, the large E0 transition strength indicates the shape mixing phenomenon [8]. The characteristics of E0 transitions provide sensitive tests of the various models of nuclear structure. We'll focus on nuclei with N =90, where sudden change in ground-state structure were observed [7].

We'll construct a new spectrometer to study of low lying excited state in super heavy nuclei. This spectrometer will be built with use of silicon detectors. The spectroscopy of the α, β, ICE particles emitted from super heavy nuclei could be performed with using the proposed experimental set-up.

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