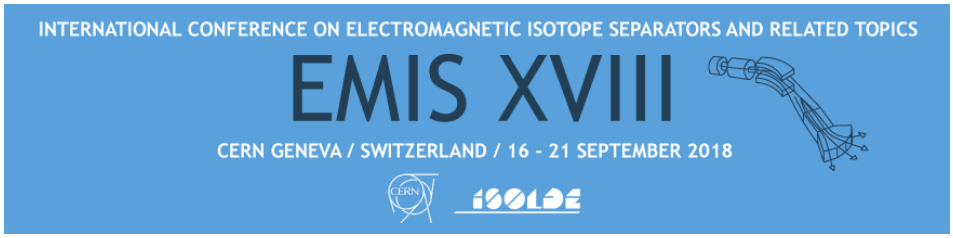

Contribution ID: **38** Type: **Poster**

Velocity filter SHELS: performance and experimental results.

Monday, 17 September 2018 17:37 (1 minute)

In recent years α-, β- and γ- spectroscopy of heavy nuclei at the focal plane of recoil separators ("decay spectroscopy") has been very intensively developed. The mixing of α decay with γ and β decay spectroscopy allows to investigate single particle states behavior as well as the structure of little known elements in the Z = 100-104 and N = 152-162 region.
In the past using the GABRIELA (Gamma Alpha Beta Recoil Invetsigations with the ELectromagnetic Analyser) set-up and VASSILISSA electrostatic separator the experiments aimed to the gamma and electron spectroscopy of the Fm –Lr isotopes, formed at the complete fusion reactions 48Ca+207,208Pb⟶ 255,256No, *48Ca+209Bi⟶ 257Lr*, 22Ne + 238U ⟶ 260No *were performed.*
Accumulated experience allowed us to perform ion optical calculations and to design the new experimental set up, which will collect the base and best parameters of the existing separators and complex detector systems used at the focal planes of these installations. New experimental set up SHELS (Separator for Heavy ELement Spectroscopy) on the basis of existing VASSILISSA separator was developed for synthesis and studies of the decay properties of heavy nuclei [1,2]. The ion optical scheme of the new separator can be described as Q-Q-Q-E-D-D-E-Q-Q-Q-D, where Q denotes Quadrupole lenses, E - Electrostatic deflectors, D –Dipole magnets. Test experiments showed that transmission efficiency for slow evaporation residues formed in asymmetric target projectile combinations (22Ne induced reactions) increased by factor of 3 –4, for more symmetric combinations (48Ca and 50Ti induced reactions) background condition at the focal plane became more comfortable.
During the last experimental campaigns (years 2016 –2018) the new double sided silicon detector (DSSD) was used at the focal plane of the SHELS separator (128x128 strips, 100x100 mm2). The detector demonstrated high stability and ensured a high resolution (0.2 %) of alpha particle registration. GABRIELA detector set up was modernized too, now it consists of 5 Ge gamma detectors (1 Clover and 4 single crystal).
At the last 2 years we performed experiments to study decay properties of 255,257Rf and 256,257Db in the reactions 50Ti + 207,208Pb ⟶ 256,357Rf and 50Ti + 209Bi ⟶ 259Db*.
[1] A.V. Yeremin et. al., PEPAN Letters, 12, 35 (2015)
[2] A.V. Yeremin et. al., PEPAN Letters, 12, 43 (2015)

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Session Classification: Poster Session 1

Track Classification: Ion optics and spectrometers