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Microtron based VEGA-m spectrometer for study of the shape isomers decays.

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In the series of experiments performed at the beam of the MT-25 microtron in FLNR, JINR, the break-up of fission fragments (FFs) while they pass a solid-state foil in the timing detector, placed at four meters from the actinide target was observed [1-3]. The results were obtained using the VEGA (V–E Guide based Array) setup. The FFs from photo-fission reactions were captured by an electrostatic guide system (EGS). The guide is a cylindrical capacitor of four meters long with a thin wire as a central electrode. Some part of the FFs were captured in EGS and transported to the time-of-flight mass-spectrometer at the opposite side of the guide, where the break-up of part of the FFs took placed. The mean time-of-flight of the FFs in the EGS exceeded 400 ns. The effect was treated as a break-up of the FF born in a long-lived shape isomer state at the stage of binary fission of mother nucleus in the target and was observed for the first time.
The main problem that was encountered during the experiment was the background noise from the accelerator. To radically improve the situation, a new VEGA-m project is underway. The guide of about 6 meters long will now be positioned vertically and therefore will enter the second floor of the microtron hall, passing about 2 m of concrete, which will protect from the radiation. Essential upgrade of both the spectrometer electronics and data processing is also being planned.

Section

Design of new experimental facilities

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