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Toward the borders of nuclear stability: exploration of exotic nuclei in FLNR

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Nuclear forces are capable of keeping together only a certain number of protons and neutrons forming nuclei situated in the chart of nuclides within an area confined to the so called borders of nuclear stability. For the time being these boundaries are known up to $Z=13$ for nuclei with neutron excess and $Z=32$ for proton-rich nuclei. The search for stability borders for heavier nuclei and exploration of properties of nuclides far from the β -stability line are the most actual task for modern nuclear physics. A number of experimental approaches have been worked out in the past few decades to reveal unusual properties of short-lived nuclei oversaturated with excess neutrons or protons. One of the main trends in nuclear science now consists in construction of radioactive ion beam “factories”, but apart from this further advance demands elaborate tools and effective techniques. This report will present some aspects of the scientific program of the Flerov Laboratory in this field, including the ideas of forthcoming experiments and techniques required for their implementation.

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