**Status of the High-Resolution Magnetic Analyzer MAVR**

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**Abstract**

A project of the high-resolution magnetic analyzer MAVR is proposed. The analyzer will comprise new magnetic optical and detecting systems for separation and identification of reaction products in a wide range of masses (5–150) and charges (1–60).

The magnetic optical system consists ofthe MSP–144 magnet and a doublet of quadrupole lenses. This will allow the solid angle of the spectrometer to be increased by an order of magnitude up to 30 msr. The magnetic analyzer will have a high momentum resolution (10−4) and high focal-plane dispersion (1.9 m). It will allow products of nuclear reactions at energies up to 30 MeV/nucleon to be detected with the charge resolution ~1/60. Implementation of the project is divided into two stages: conversion of the magnetic analyzer proper and construction of the nuclear reaction products identification system.

The MULTI detecting system is being developed for the MAVR magnetic analyzer to allow detection of nuclear reaction products and their identification by charge Q, atomic number Z, and mass A with a high absolute accuracy. The identification will be performed by measuring the energy loss (ΔE), time of flight (TOF), and total kinetic energy (TKE) of reaction products. The particle trajectories in the analyzer will also be determined using the drift chamber developed jointly with GANIL.

In 2019 it is planned to continue investigations of mechanisms for nuclear reactions due to beams of are stable nuclei, such as 36S, 48Са, 58Fe, and 64Ni, and with beams of radioactive nuclei in a wide energy range from sub-barrier energies to several tens of MeV/nucleon. When started up, the upgraded U400R cyclotron. Characteristics of nuclear reactions will be measured using the magnetic analyzer MAVR with a high energy resolution.

An important objective is also investigation of sub-barrier processes in fusion and transfer reactions with the participation of loosely bound halo-like nuclei 6Не, 8Не, 9Li, 11Li, and 8В produced as secondary beams. This experimental investigation is of great interest for solving fundamental problems of nucleosynthesis in astrophysics.

The program of investigations in this field can include the following:

1. Determination of nucleon stability/instability of exotic nuclei.
2. Measurement of their mass using the missing mass method.
3. Investigation of excited states and resonances in exotic nuclei.
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5. Search for cluster states in light nuclei.