Thursday, 28 November 2019, 15.00
Room 310

1. T. I. Mikhailova

Description of Heavy-Ion Fragmentation Reactions in a Combined Transport and Statistical Approach

Heavy-ion fragmentation reactions at energies up to several 100 MeV per nucleon produce nuclei with exotic charge-to-mass ratios, which are of interest for the production of radioactive beams, and for applications. We treat such reactions microscopically by transport theory, which evolves the phase-space density with a mean field and dissipative two-body collisions. Primary fragments are formed, when the nuclear interaction between them ceases. These are still highly excited, and their de-excitation by evaporation of particles is treated by statistical descriptions. We have worked on a systematic study within this scheme using a Boltzmann-Uehling-Uhlenbeck (BUU) transport code together with the Statistical Multifragmentation Method (SMM) for the deexcitation. An important aspect is a consistent description of initial nuclear ground states and the calculation of the excitation energies of the primary fragments. The numerical solution of the transport equation by simulations is discussed, as well as the statistical sampling of the final configurations. As results we will show yields and the energy spectra of the fragments for a number of colliding systems in the energy range of 35 to 140 MeV per nucleons in comparison to experimental data.

2. Karamysheva T.V.

Optimization of processing techniques of measured magnetic field maps of a cyclotron

Efficient and accurate computer simulation is very important in the design and manufacture of accelerators. The accuracy of calculating the beam dynamics is determined by the accuracy of the field map used in the calculation. The representation in the form of a three-dimensional field map is obviously the most acceptable for calculating the dynamics of the beam. However, magnetic field measurements are carried out only in the median plane; therefore, the magnetic field components outside the median plane are calculated by expanding the magnetic field in a Taylor series. We came to the conclusion that the transition from a cylindrical to a Cartesian coordinate system for the process of calculating the derivatives gives the best results. A comparison is made of the expansion results up to 2d-4th order in the calculation of derivatives in a cylindrical and Cartesian coordinate system using the example of the SC202 superconducting cyclotron for proton therapy, developed at the JINR DLNP with computational and information support of LIT in collaboration with the Institute of Plasma Physics (Hefei, China).