Contribution ID: **475** Type: **Plenary**

Model of experiments and a method of analysis of data for determination of absorbed dose of samples for applied research at the NICA facility

Friday 4 July 2025 09:00 (30 minutes)

Model of experiments for applied research at the NICA facility are developed and manufactured. Model includes two ionization chambers IK-1, IK-2, strip and phosphor chambers for measure profile with coordinate and intensity of beam and various sample holders with different geometry. At those chambers, the materials of electrodes are used different, at the IK-1 it is foil-clad fiberglass, for the IK-2 are taken foil-clad polyimide One of the ionization chambers will be assembled before irradiated samples, other mounted after. The strip chamber will be added for measure the coordinate of beam or it will replace the IK-2 ionization chambers. By the phosphor chambers will be tracked and follow the profile of beam. The chambers IK-1 and IK-2 have been tested on a ^{60}Co gamma source and a 150 MeV proton beam at the accelerator "Prometheus"at the Tsyba MRRC (Obninsk).

A method for analysis of the intensity and profile data by using the 3.8 GeV/nucleon $^{124}Xe^{54+}$ ion beam data is developed. The method is necessary to provide the precise determination of the fluence and absorbed dose for irradiated materials. The beam profile and intensity distributions together with overall intensity and duration of radiation exposure are used for the developing the method of analyzed for the set of samples of different geometry and chemical composition. The analyzed raw data were taken in the long-term exposure mode. Software was developed for investigation of intensity and profile of the beam. Because the data is a sequence of intensity values per short run, each run will be analyzed separately. The intensity will be measured before collision with the target for what were require additional study on how the intensity decreases after passing through each detector and approximation of the intensity, which reaches a particular sample. Distributions of beam intensity and profile versus exact duration of irradiation will be obtained for each investigated sample. Each sample will be at the beam sequentially in series that results in individual profile for particular sample. The distributions will be obtained by the developed software for the input data and further precise calculation of energy losses and absorbed dose in irradiated materials. Those several different parameters necessary to investigate and explore, the uncertainty is under study.

The study is performed within the ARIADNA Collaboration.

Primary authors: PUKHAEVA, Nelli (JINR; North-Ossetian State University, Russia); KASUMOV, Yuri (North-Ossetian State University, Russia); CHULUKHADZE, Gennady (North-Ossetian State University, Russia); BEREZOV, Artur (North-Ossetian State University, Russia)

Presenter: PUKHAEVA, Nelli (JINR; North-Ossetian State University, Russia)

Session Classification: 0. Plenary

Track Classification: Section 3. Modern methods and technologies of nuclear physics.