Contribution ID: **1758**   Type: **Oral**

Highly efficient radon detectors

Thursday 31 October 2024 17:45 (15 minutes)

Radon is a naturally occurring noble radioactive gas formed by the decay of radioactive chains of thorium and uranium. Radon and its daughter decay products are being increasingly studied, and their background contribution to low-background experiments for neutrino studies, dark-matter particle searches and other experiments requiring low-background conditions is also being investigated.

At the Dzhelepov Laboratory of Nuclear Problems (DLNP) of the Joint Institute for Nuclear Research (JINR), two compact radon detectors have been developed with an expected sensitivity level of ~1 mBq/m³. The first detector, with chamber volume of 5.8 liters, is based on the electrostatic collection method design of radon daughter products (RDP) on the surface of a silicon detector. The second compact detector, with an internal chamber volume of 0.9 liters, was made using a new method of reverse charge collection of RDP. This scheme is characterized with only a bias voltage applied to the detector. The charge collection field is formed by a grid with high positive voltage around the detector volume. This detector design overcomes several limitations of existing systems and enables efficient assessment of radon and its decay products concentration.

Primary author: ШАХОВ, Константин (JINR)

Co-authors: Mr LUBASHEVSKIY, Alexey (JINR); PONOMAREV, Dmitrii (DLNP); Dr YAKUSHEV, Evgeny (JINR); Mr ROZOV, Sergey (JINR)

Presenter: ШАХОВ, Константин (JINR)

Session Classification: Experimental Nuclear Physics

Track Classification: Experimental Nuclear Physics