Contribution ID : **103** Type : **Poster**

Characteristics Of SiC-and Si-detectors After Alpha Particle Irradiation

Tuesday, 22 October 2024 17:05 (115)

The results of a study of detectors made of silicon carbide (SiC) and silicon (Si) are presented. The irradiation was carried out using exemplary spectrometric α-sources with energies $E = 4.8 - 7.7$ MeV. The thickness of the epitaxial layer of the n-type SiC detectors was 25 and 50 microns, with a contact diameter of 3.0 mm. The initial energy resolution of the detectors was <25 keV. Si detectors were manufactured using planar technology on n-type silicon, with a working area of 7 mm^2 and a thickness of 300 microns. The radiation resistance of SiC and Si detectors was studied before and after irradiation with alpha particles with integral fluxes up to about 1.6×10^{11} α/cm^2. It is shown that degradation was observed after irradiation with α-particles: peaks from α-particles shifted towards smaller channels and became wider. It was found that with an increase in the radiation dose, the energy resolution deteriorates up to 11.5 times for SiC 50 microns, up to 3.5 times for SiC 25 microns and up to 2 times for Si. At the same time, the charge collection efficiency η (CCE) decreased from 100% to 85% (operating voltage 300 V) for SiC 50 microns, from 100% to 95% (operating voltage 200 V) for SiC 25 microns and from 100% to 98% (operating voltage 100 V) for Si at the maximum radiation dose.

Primary author(s) : Mr. EVSEEV, Sergey (DLNP JINR)

Co-author(s) : Dr. GUROV, Yury (MEPhi); Mr. DOVBNENKO, Maksim (Joint Institute for Nuclear Research); Mr. ZAMYATIN, Nikolay (JINR); Mr. KOPYLOV, Yury (JINR); Mr. ROZOV, Sergey (JINR); Mr. HRUBCIN, Ladislav (IEE SAS); Mr. ZAT'KO, Bohumir (IEE SAS)

Presenter(s) : Mr. EVSEEV, Sergey (DLNP JINR)

Session Classification : Poster session

Track Classification : Facilities and advanced detector technologies