

## **Introduction of the High-Energy Neutron and Ion Implant Accelerator Facility at the KOMAC**

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The Korea Multi-Purpose Accelerator Complex (KOMAC) operates a 100 MeV proton linear accelerator that produces high-energy neutrons through a beam dump configuration. The resulting neutron field extends up to approximately 100 MeV, providing a broad energy spectrum representative of terrestrial radiation environments. Facilities capable of reproducing atmospheric neutron spectra are increasingly important for radiation effect evaluation, particularly in studies of single-event effects and material degradation in advanced electronic systems.

Ongoing efforts at KOMAC focus on establishing neutron energy and dose spectra using various detectors, while also introducing techniques for neutron–gamma discrimination and dose monitoring. However, measurement technologies for neutrons above 10 MeV remain insufficient, limiting the accuracy of radiation assessments. This limitation underscores the need for advanced detection methodologies.

In addition to neutron studies, KOMAC operates gas and metal ion implanters that enable controlled modification of materials at the atomic scale. Ion implantation is employed to investigate color center formation and its impact on scintillator emission wavelengths, gemstone coloration, and the development of nitrogen-vacancy (NV) centers in diamond for quantum sensing applications. These complementary research activities expand the scope of the facility, bridging radiation effect evaluation with material science and quantum technology.