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Development and Future Applications of the NARI 70 MeV Cyclotron

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The National Atomic Research Institute (NARI) is developing a 70 MeV proton cyclotron, with construction set from 2023 to 2027. The cyclotron is designed to operate at proton energies from 28 to 70 MeV and a maximum current of 1000 micro-amperes. It will serve three main purposes: (1) medical isotope production, (2) proton irradiation testing, and (3) cyclotron-based neutron source development.

NARI aims to ensure a stable supply of radioisotopes for nuclear medicine, such as Tl-201, I-123, and Ga-67, while advancing the development of isotopes like Cu-67 and Mo-99. In addition to medical uses, the cyclotron will simulate space radiation environments for aerospace materials testing and radiation measurement standards.

The cyclotron will also support neutron-based technologies, benefiting nuclear physics, new materials, and industrial applications. Neutron research will occur in two phases: Phase I (2023–2026) will establish a thermal neutron target station for neutron diffraction studies, and Phase II (2027–2030) will develop a quasi-monoenergetic neutron (QMN) source for soft error rate testing in electronics and a high-resolution neutron imaging station.

Expected to be fully operational by 2028, the facility will include seven beamlines, two solid target stations, one gas target station, and specialized laboratories for proton, fast neutron, and thermal neutron research. The NARI 70 MeV cyclotron will support both routine isotope production and advanced scientific research.

Footnotes

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