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Implementation of a new and high quality neutron radiography beamline at the Tehran research reactor

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A new neutron collimator as an important part of a neutron imaging facility is designed, installed and experimentally characterized at the Tehran Research Reactor. The design calculations are performed using MCNP monte Carlo code. Preliminary experimental characterization of the beam shows a thermal neutron flux of about $6.1\times10^{6} n\ cm^{-2}s^{-1}$ and a N/G ratio of about $4.82\times10^{5}\, n\, cm^{-2} mrem^{-1}$ at the 3-m image plane (L/D=150). Furthermore, the obtained neutron beam is characterized using the ASTM BPI and SI indicators and measurements indicate that the obtained radiographic image at this beam is of Category-I beam quality as defined in ASTM E545 standard.

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