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Feasibility analysis for the extraction of a thermal NR beam at the MNSR reactor

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In order to expanding the utilization of MNSR reactor, the possibility of extracting an appropriate thermal neutron beam for neutron radiography (NR) application is investigated. According to the physical restrictions of the MNSR, neutron beams are designed based on the vertical-tangential and oblique-tangential directions. Also, a thermal column is considered to reduce energy of neutrons. All designs are done by considering the least possible changes in the current reactor status. Results show that it is possible to obtain an appropriate NR beam with thermal neutron flux of about $2.53\times10^{6} n.cm^{-2}.s^{-1}$. The diameter and the collimation ratio of the obtained neutron beam at the image plane are 24 cm and 96, respectively. In addition, the thermal neutron flux has a good uniformity at this plane (flux fluctuation is <5%).

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