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Investigating the role of S-shape guide in neutron guidance system with $^{241}\text{Am-Be}$ source

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Abstract

Guides play a key role in concentrating the neutron beam and increasing the flux for a neutron guide system. In this research, the role of a radius of curvature and length parameters on neutron intensity on the sample for the S-shape guide has been investigated and the results have been analyzed for three different types of geometry. In this work, the Monte Carlo simulation method is used with McStas software. The results show that at a constant radius with increasing length, the guide moves more towards bending and passes neutrons with less energy. Conversely, at a constant length with increasing radius, the guide gradually deviates from the curved state and it leads directly to the straight guide, all of the neutron energy spectra passes. A radius of curvature of 70 m and a length of 4 m were chosen for the S-shaped guide due to the passage of a larger range of thermal neutron fluxes. The guide radius can lead to a cut-off wavelength for neutrons. This guide can also eliminate fast neutrons and gamma rays..

Keywords: guides, beam neutron, McStas software

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