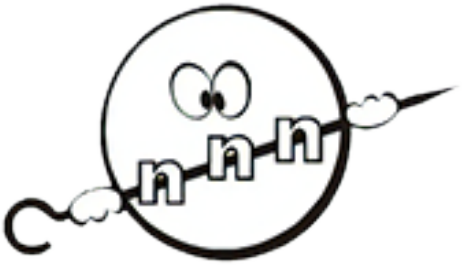

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Calculation for Improving the Efficiency of Ultracold Neutron Transport Using Monte Carlo Method

Thursday, 29 May 2025 09:35 (15 minutes)

The development of intense low-energy neutron sources requires extensive calculations to refine the design to meet practical needs. With the appearance of liquid helium-based ultracold neutron sources (UCN), from which all UCN can be released through a small outlet, it became possible to use a new type of mirror neutron guides. They consist of three main parts: a short expanding part, a long parallel part, and a short tapering, focusing part. This research has shown that such neutron guides reduce UCN losses during transportation several times and increase the UCN density at the outlet several times, compared to traditional parallel neutron guides. The research was conducted using the GEANT4 simulation toolkit [1-4]. Such a neutron guide can be used in the design of the ALSUN UCN source at the Institute of Nuclear Physics in the Republic of Kazakhstan [5].

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