

The concept of an experiment on measuring the length of coherent scattering of natural gadolinium

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In the course of this work, a review of articles on the topic was conducted, some methodological errors were identified and contradictions in the experimental results were revealed. An analysis of the Frank et al. experiment from 2002 was performed. It was shown that the depth of oxide penetration into the protective layer of titanium, which was used in this experiment to prevent gadolinium oxidation, significantly affected the results. An experiment was considered to measure the constant component of the coherent scattering length of natural gadolinium in a geometry where a neutron beam falls on gadolinium through a silicon substrate. To prepare for this experiment, reflection curves with different values of the constant scattering length b_0 were calculated. The results obtained are considered preliminary, and their reliability will be confirmed after the experiment is completed.

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