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Effects of interfacial potential smoothness on reflectivity, phase, and polarization of reflected neutrons from magnetic films in neutron reflectometry

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Abstract

In the past decades, neutron reflectometry have flourished as an applicable method to the study of thin films. As an example, the type and thickness of an unknown thin film which is mounted on top of a magnetic substratum could be determined by measuring the intensity and polarization of the reflected neutrons from the sample. Neutron reflectometry is based on solving the one dimensional schrödinger equation and determining the reflection coefficient at two distinct boundaries. In this paper by considering three smooth varying potential (linear, eckatrt and error function), we have investigated the effects of continuity of interfacial potential on determination of reflectivity, phase and polarization of reflected neutrons from the sample.

Keywords: neutron reflectometry, smooth potential, Eckart potential, error function

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