

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Monte-Carlo Resampling Analysis of Neutron and X-ray Reflection Data F. HEINRICH, Carnegie Mellon University, Pittsburgh, PA, and NIST Center for Neutron Research, Gaithersburg, MD, P. SHEKHAR, Carnegie Mellon University, Pittsburgh, PA, P. KIENZLE, NIST Center for Neutron Research, Gaithersburg, MD, M. LOESCHE, Carnegie Mellon University, Pittsburgh, PA, and NIST Center for Neutron Research, Gaithersburg, MD — In most cases, reflectivity data analysis relies on the use of a structural model with reasonable physical constraints. Commonly, parameter confidence intervals are estimated, and the choice of the adequate model solely relies on the of the experimenter. We present the implementation of a Monte-Carlo resampling technique for reflectometry data analysis [F. Heinrich et al. A new lipid anchor for sparsely-tethered bilayer lipid membranes. *Langmuir*, submitted]. It is based on the statistical evaluation of a large number of fits with resampling. This technique provides access to precise confidence intervals for model parameters and parameter correlation matrices. It allows one to identify an over-parameterization of the model and provides a tool for a controlled model extension with additional parameters. This becomes especially important in the prospect of the new neutron sources where data with higher information content will be available. We also present an emerging application of the Monte-Carlo resampling technique that allows the determination of unknown elements free of any structural assumptions.

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Date submitted: 26 Nov 2008

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