ICANS XX,
20th meeting on Collaboration of Advanced Neutron Sources
March 4 – 9, 2012
Bariloche, Argentina

Improved neutron optics and detectors designed with McStas using global optimization tools

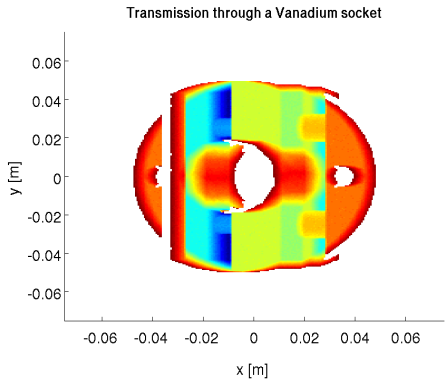
E. Farhi, Institut LaueLangevin, France

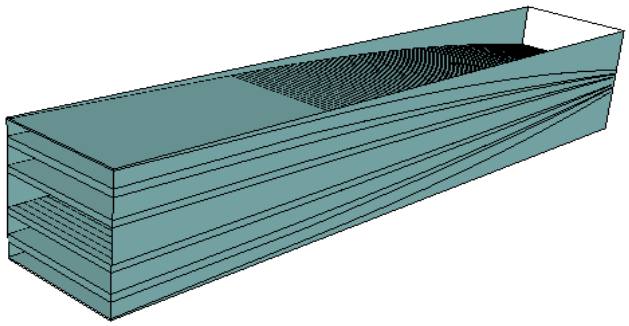
farhi@ill.fr

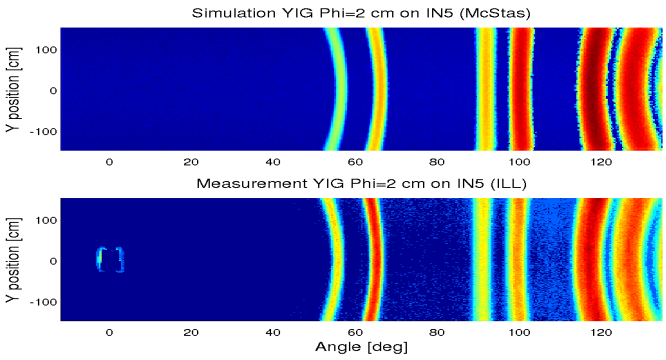
Abstract

We shall present recent progress in the design of neutron optics and detectors, studied using McStas simulations, and compared with experiments when possible. The availability of advanced virtual experiment tools, such as McStas [1], combined with efficient optimization methods [2] allow for new advances in the neutron optics design. Such studies will usually start from an initial blueprint based upon analytical equations, and be left for optimization with a zoo of optimizers (e.g. Swarms, genetic, gradient, simplex, …).

New multichannel geometries of focusing nose for mmsized samples have been optimized with McStas and iFit. Such nose may be used as well in the design of virtual sources in a multibeam SANS instrument, that will be demonstrated. In this study, any complex geometry may be modeled from a set of points in space, either as a bulk material, or reflecting surfaces. We shall also present results from a complete IN5 ToF spectrometer, including accurate gas detector models. Such simulations can then be extended the new boron based detectors to overcome the ever increasing ^{3}He cost.







[1] http://www.mcstas.org

[2] http://ifit.mccode.org