

## **Neutron Multilayers**

T. Bigault<sup>1</sup>, V. Gaignon, G. Delphin, A. Vittoz, P. Courtois

<sup>1</sup>Institut Laue Langevin, 71 avenue des Martyrs, 38042 Grenoble, France  
bigault@ill.eu

Various types of optical devices based on multilayers have been developed in order to transport or change the properties of neutron beams: mirrors, monochromators, filters, guides, spin polarising mirrors or benders, focusing devices, antireflection/absorbing coatings... All of them are based on the tailored reflection or transmission properties of a surface coated with a multilayer. The most well-known and widespread application is the use of glass guides coated with supermirrors, which is now used extensively to transport neutron beams across large distances from neutron sources to instruments. Besides this, the design of optical devices has to be optimised for each neutron technique, depending on its requirements and instrumental constraints. The performance of the final device generally strongly depends on the precise characteristics of the multilayer, including exact layers thicknesses, roughness of interfaces and their correlations, magnetic structure and properties in the polarised case. This strong connection between multilayer exact properties and final device performance will be illustrated through selected examples, with particular focus on polarising multilayers.