

Multilayers for neutron applications: Fabrication of a polarizing Fe/Si supermirror bender.

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The fabrication of a neutron supermirror polarizer will be presented. The polarizer is made out of thin silicon wafers bended with an S-shape, coated on both sides with polarizing Fe/Si supermirrors with a critical angle $\theta_c = 3.2 \times \theta_c(\text{Ni})$, and placed within a magnetic field in order to magnetize the layers. The particular properties of this polarizer gives some advantages over more classical supermirror polarizer designs with a C-shape and air channels, as was shown by the prototype that was produced earlier [1]. Various aspects of the project will be presented: principle and design of the polarizer, Fe/Si supermirror coating optimization, testing with a neutron beam. The present limitations of this device will be addressed, and some ideas on how to overcome them and improve the performance further will be presented.

[1] A. Stunault *et al.*, *New solid state polarizing bender for cold neutrons*, Physica B **385-386**, 1152 (2006).

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