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Wide-Angle Solid State Polarization Analysis for MAGiC

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We have developed the concept of a new type of a 120° wide-angle polarisation analyser and report first results of the prototype. The analyser is based on the principle of internal reflections of magnetic FeSi multilayers in straight, 150 µm thin Si channels. This internal reflection avoids the SLD step present between air. This technique yields high transmission and produces no blind spots on the detector in contrast to current supermirror-based wide-angle analysers. A first trial has been successfully performed at the AMOR reflectometer at SINQ for wavelengths between 3 AA and 8 AA. Particular care has been paid to the design of the holding field that provides a high field of minimum 0.1 T over the complete 120° with very high uniformity in the reflection plane.

The analyser is being developed for the ESS instrument MAGIC, a permanently polarised diffractometer dedicated for magnetism studies using small single crystals, by the in-kind partners LLB, FZJ and PSI.

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