

Title (en)
NEUTRON OPTICAL ELEMENT FOR THE SMALL ANGLE NEUTRON SCATTERING MEASURING TECHNIQUE

Title (de)
NEUTRONENOPTISCHES BAUELEMENT FÜR DIE NEUTRONENKLEINWINKELSTREU-MESSTECHNIK

Title (fr)
ELEMENT STRUCTURAL D'OPTIQUE NEUTRONIQUE POUR LA TECHNIQUE DE MESURE PAR DIFFUSION DE NEUTRONS A PETIT ANGLE

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Application
EP 03750298 A 20030825

Priority

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Abstract (en)
[origin: WO2004021365A2] A high measuring resolution along with a large irradiation surface and a high beam intensity are required for structural analyses of material according to the small angle neutron scattering measuring technique. However, with known diaphragm collimators, the necessary beam divergence cannot be reached without an unacceptable loss of intensity. The inventive neutron optical element (1) comprises a plurality of successively arranged pinhole diaphragms embodied as grating diaphragms (7), each grating diaphragm (7) comprising a plurality of diaphragm apertures (14). In this way, the neutron beam is divided into individual beams which are each improved in terms of the convergence thereof. Furthermore, the channels defined by the course of the grating diaphragms (7) by means of respectively identically positioned diaphragm apertures (14) are narrowed according to the convergence cone provided by the structure of the measuring instrument. Simultaneously, all of the partial beams can be focussed onto the detection spot. In order to select monochrome neutrons, the grating diaphragms (7) are positioned on the speed-dependent parabolic paths. In this way, the claimed, neutron optical element does not only function as a high-resolution, focussing collimator, but also as a speed selector. The continuous and cyclic displacement of the grating diaphragms (7) over all of the parabolic paths enables the entire neutron beam to be used. In this way, the inventive neutron optical element can be especially used for pulsed neutron beams.

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