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On a new method of diffraction microradiography of single crystals

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A new method of diffraction microradiography of single crystals has been proposed and implemented, based on increasing the resolution of X-ray topographic patterns. A special device has been developed, created, and tested that makes it possible to scan synchronously the slit for transmitting separate parts of the X-ray diffraction pattern and X-ray film with a predetermined speed ratio. The possibility of significantly increasing the resolution of X-ray diffraction patterns using the suggested new scanning method has been experimentally proven. It is shown that if individual parts of the diffracted beam are passed successively through a special narrow slit, which is synchronously scanned along with the X-ray film, we obtain a linear increase in topographic patterns. A proposed scheme for increasing the picture in parts, and a description and operating principle of the scanning device are also presented. A relationship between the ratio of the velocities of the slit and the X-ray film movement with the parameters of the scanning device and the sample (slit width, total thickness of thin crystals, thickness of a thick crystal, etc.) was revealed. The velocities of the reciprocating motion of the slit and the X-ray film were calculated. It has been experimentally proven that the scanning process does not introduce new information into the interference pattern, but only increases it, since these patterns in sectional topograms differ only in size in the scattering plane.
Keywords: X-ray interferometer, X-ray diffraction pattern, resolution, scanning, crystal.

Autori principali: Dr. DRMEYAN, Henrik (Institute of Applied Problems of Physics NAS RA); Dr. MKHITARYAN, Samvel (Institute of applied problems of Physics NAS RA); MNATSAKANYAN, Armine (Institute of applied problems of physics NAS RA); MKRTCHYAN, Artak (Institute of applied problems of physics NAS RA)

Relatore: MNATSAKANYAN, Armine (Institute of applied problems of physics NAS RA)

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