High-Resolution Neutron Diffraction Monochromators

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Cylindrically bent perfect crystals (BPC) as neutron monochromators/analyzers have been proved as an excellent alternative of conventional mosaic crystals providing a way how to increase luminosity and angular/energy resolution of some dedicated scattering devices installed at steady state sources [1-3]. In our contribution we present the recent results of test experiments with dispersive monochromators based on a double-reflection process realized either in one cylindrically bent perfect crystals (often called as Renninger or *Umweganregung* effect) or by means of a sandwich using two bent perfect crystal slabs of a different cut. Depending on the bending radius of the crystal slab (or the sandwich of two slabs) the resolution $\Delta\lambda/\lambda$and the $\Delta\alpha$ collimation of the monochromatized beam can be continuously adjusted in the range of $5x10^{-5}$ - $1x10^{-3}$. Of course, that the dispersive bent perfect crystal elements can be used also for the high-resolution analysis of the scattered beam as well as for a high precision λ-calibration of the TOF neutron scattering devices.

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