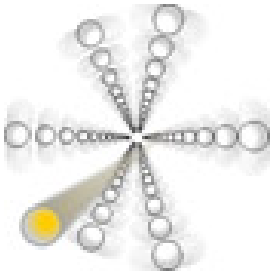

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High Energy Channeling History

Sunday, 23 September 2012 15:15 (30 minutes)

This short primer will cover the developments of GeV and TeV-scale channeling over more than four decades and also look to the future. Early studies at CERN and Fermilab confirmed that GeV scale channeling continued the behavior seen in the MeV regime. While working on the first channeling experiment at Fermilab, Tsyganov suggested using bent crystals. This enormously amplified the possibilities for channeling at high energy. Tsyganov and others subsequently demonstrated bent crystal channeling at Dubna. Experiments at Serpukhov, CERN, and Fermilab applied these new techniques to beam manipulation, collimation, and extraction. Overlooked in the initial wave of developments was a significant idea due to Taratin and Vorobiev for volume reflection. Clever arrangements of multiple crystal arrays such as those developed by Guidi have overcome the limitations of small deflection angles for volume reflection. Short crystal bending schemes have also broadened channeling possibilities. For the future, sophisticated approaches to crystal alignment are raising the hopes for axial bending. There are topics still to be covered in the detail they may merit. Muon channeling with the opportunity to study negative particles deserves more attention. Almost at the same time Tsyganov suggested bent crystal channeling, he also proposed using channeling for cooling beams. These and other possibilities for the future will be reviewed.

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