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Advanced Channeling Technologies to Guide Charged and Neutral Beams

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Channeling is the phenomenon well-known in the physics world mostly related to the motion of the beams of charged particles in aligned crystals. Since the beginning of 1970s channeling of high-energy leptons (electrons/positrons of several MeV up to hundred GeV energies) and hadrons (protons/ions of tens GeV up to several TeV energies) has been applied at various famous world research centres within different national/international projects related to the phenomenon utilisation to handle the beams as well as to produce high power X-ray and gamma radiation sources.

However, recent studies have shown the feasibility of channeling phenomenology application for description of other various mechanisms of interaction of charged as well as neutral particles beams in solids, plasmas and electromagnetic fields covering the research fields from crystal/laser/plasma based beam guides and collimators to capillary guides for charged beams and X-rays/neutrons.

This review talk is devoted to actual channeling-based projects that have been realizing since so-called renaissance of channeling studies started in the end of last century. The future possible developments in channeling physics for accelerator physics will be analysed within the presentation.

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