STATE-OF-THE-ART OF CHANNELING OF CHARGED PARTICLES IN CRYSTALS AND NANOSTRUCTURES:

BEAMS CHANNELING FOR ACCELERATOR AND RADIATION PHYSICS

SULTAN B. DABAGOV
INFN LABORATORI NAZIONALI DI FRASCATI, 00044 FRASCATI (RM), ITALY

Channeling is the phenomenon well-known in the physics world mostly related to the propagation of the beams of charged particles in aligned crystals. Since the discovery, channeling of high-energy leptons (electrons/positrons of several MeV up to hundred of 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 shape 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 undulators and collimators to capillary based x-ray and neutron optical elements.

This talk is devoted to actual channeling related projects that have been realising since so-called renaissance of channeling studies started in the end of last century, as well as to the future possible developments in channeling (bulk and surface) physics that has been extended from the crystals to the external structured electromagnetic fields.