Contribution ID: **83** Type: **Oral**

Channeling experiments at the Mainz Microtron MAMI

Thursday, 12 September 2019 10:10 (20 minutes)

The electron accelerator MAMI is multilevel racetrack microtron with a beam energy from 180 MeV up to 1.6 GeV and a continiuous beam current of more than 20 μA. The excellent beam quality due to the low emittance in transveral and longitudinal direction is well suited for channeling experiments and related radiation investigations.
The possibility to produce undulator-like radiation in the hundreds of keV up to the MeV region by means of channeling in periodically bent crystals is well known (see [1] for a review). The usual schemes of making crystalline undulators involve some method of bending the planes or axes of the crystal, altering the usual channeling. One scheme, the large-amplitude, large-period, bends the planes such that the bending amplitude and period of the planes are significantly larger than the amplitude and period of the channeling motion. A second scheme consists of having a short-amplitude, short-period configuration. The bending of the planes only slightly perturbs the channeling motion trajectory, leading to increased radiation emission at higher photon energies than the usual channeling radiation.
In recent years, experiments have been carried out at MAMI to investigate the radiation emission of channelled electrons in periodically bent silicon and diamond crystals. The results will be discussed for several epitaxially grown strained layer Si1-xGex crystals and boron doped diamond crystals at electron beam energies between 270 and 855 MeV.
[1] W. Greiner, A.V. Korol, A.V. Solov'yov, Channeling and Radiation in Periodically Bent Crystals, (Springer, 2012).

Work supported by the European Commission (the PEARL Project within the H2020-MSCA-RISE-2015 call, GA 690991).

Summary

Topic

1. Crystal Channeling and related mathematical, physical and chemical issues

Primary authors: LAUTH, Werner (Institut für Kernphysik, Johannes Gutenberg-Universität, D-55099 Mainz, Germany); BACKE, H. (Institut für Kernphysik, Johannes Gutenberg-Universität, D-55099 Mainz, Germany)

Presenter: LAUTH, Werner (Institut für Kernphysik, Johannes Gutenberg-Universität, D-55099 Mainz, Germany)

Session Classification: Morning Session 2