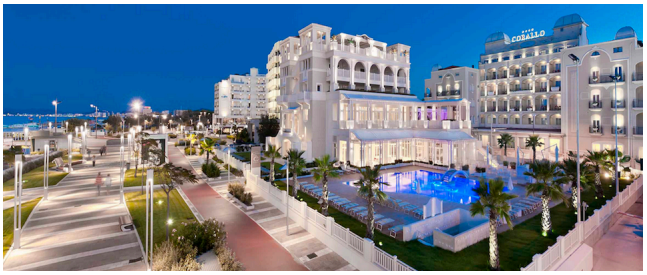

Contribution ID: **67** Type: **oral**

Study of the influence of the curvature radius and the beam energy on beam steering and radiation by sub-GeV electrons

Monday, 5 June 2023 11:40 (20 minutes)

In this work we report the observation of sub-GeV electrons deflection and radiation emission in ultrathin silicon crystals, bent along (111) planes, at the MAinzer Mikrotron (MAMI). The crystal length of $15\mu m$ was chosen to be comparable with the dechanneling length of electrons. Firstly, at the fixed energy of 855 MeV, the channeling efficiency, the dechanneling length, the volume reflection angle as well as the radiation spectra were measured in dependence on the crystal curvature and its orientation. All the results were critically compared with our Monte Carlo simulation. The trade-off between radiation intensity and angular acceptance at different values of the crystal curvature was studied, and it was concluded that, using volume reflection, intense gamma radiation can be produced –with intensity comparable to that obtained in channeling but with a higher angular acceptance[1].
Secondly, with a second crystal with a fixed radius of curvature, the modification of radiation spectra and channeling/VR efficiency was studied at different values of beam energy, i.e., at 300, 600, and 855 MeV.
All these results are relevant for crystal-based beam steering/extraction from electron synchrotron as well as for the realization of an innovative intense X-ray source via channeling in a periodically bent crystal[2].

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