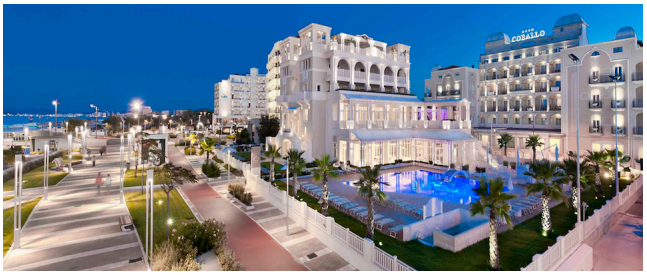

Contribution ID: **86** Type: **oral**

Adiabatic Invariants at Channeling in a Curved Crystal

Friday, 9 June 2023 09:50 (20 minutes)

The channeling effect in a curved single crystal is considered. In an accompanying reference frame moving along a plane or channeling axis at a speed equal to the longitudinal component of the electron velocity, such motion is essentially an implementation of the model of a one-dimensional 1D atom or a two-dimensional 2D atom, and with controllable parameters. The depth and shape of the potential of the channeling plane or the ion axis of channeling depend both on the chemical composition, crystal structure and orientation of the crystal, and on the energy of the electron moving in the planar or axial channel. It is important that the mode of movement in the channel remains stable even when moving in a curved single crystal. Using expressions for adiabatic motion invariants, the article estimates the maximum bending angle of a single crystal at which motion in the planar or axial channeling mode still retains stability. It is demonstrated that the maximum bending angle of a single crystal should not exceed the Lindhard's critical channeling angle, which limits the hypothetical possibility of using curved single crystals to deflect the beams of accelerated particles to only small deflection angles.

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Session Classification: S1 & S4: Beams Interactions & New Concepts