Contribution ID: **168** Type: **Poster**

Dynamics of the Relativistic Particles and Conformal Mapping of the Crystal

Thursday, 29 September 2016 18:40 (1 hour)

Dynamics of the Relativistic Particles and Conformal Mapping of the Crystal
G.V. Kovalev
School of Mathematics, University of Minnesota, Minneapolis, MN 55455,USA

The dynamics of relativistic particles is depended on the shape of the crystals and beam optics. The bending of the crystal is possible in many ways. One of the most powerful and natural way to find the needed bent is the using the conformal transformations or conformal mappings in which the crystal can be bent in 2D space with preservation of the angles between all crystal axes. If the original shape of a crystal is parallelepiped with coordinate system x,y,z and the bent is done around the axis z, the conformal bent must be such that the complex transformation x+iy = f(ξ +iη) is satisfied. Here f(x) is any real function which can be written in complex form as f(ξ+iη) = u(x,y)+iv(x,y) where functions u(x,y), v(x,y) are called harmonic and they satisfy Cauchy-Riemann equations. For example, the first steering crystals were manufactured in circular bent, which correspond to conformal transformation x + iy =e^(a(ξ+iη)), a is a constant. Many others bents are possible, for example x + iy = (ξ + iη)^n or x + i y = sin(ξ + iη), but
most of them did not considered. Purpose of this report is to consider some of them. There is obviously infinite number of conformal coordinate systems and therefore suitable bents of the crystal and all of them have the orthogonal properties. Of course, not all of them can be manufactured, but plenty of them can be approximated in order to give the optimal bent of crystal.

References

[1] P.M. Morse, H. Feshbach, Methods of Theoretical Physics, vol. 1, Ch. 4-5, McGraw-Hill Book Co., New York, 1953.

Primary author: Dr KOVALEV, Gennady (U of M)

Presenter: Dr KOVALEV, Gennady (U of M)

Session Classification: PS3: Poster session