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## High Energy Microbeams and Focusing Limits of Channeling Particles

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High Energy Microbeams and Focusing Limits of Channeling Particles G.V. Kovalev

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The possibility of beam steering of high energy particles by a crystal has been investigated for a long time. Tsyganov was the first who proposed the bent crystal channeling. After the successful demonstration of the bent channeling[2], it became clear that bent

crystals can be used for constructing a focusing element with extremely short focal length and focal spot close to size of one atomic channel. Several crystal devices for focusing were suggested [3-4]. Their common idea is based on differently bent plane

channels to provide a 1-D beam convergence to a focal point. Because the crystal planes are naturally parallel, the focusing device must exert an external force making channels converged. Carrigan[3] suggested a simple solution where a monocrystal is partially cut

into thin parallel slices with empty gaps between them. To focus the beam the slices should be pressed together. Another solution is to apply a strong external pressure providing channel's convergence of the bulk crystal. The further improvement in this direction are led to mixed crystals with smooth change in the lattice constant. Similar

constructions with graded composition layers were suggested and tested for a deflection of particles. All other developments[5] and suggestions are discussed in this work.

References

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