

## **Intraband electron focusing by a flat lens in bilayer graphene**

**Laszlo Oroszlany**, Csaba Peterfalvi, Jozsef Cserti, Colin Lambert

Eötvös University Budapest

Department of Physics of Complex Systems Eötvös

University H-1117 Budapest Pázmány Péter sétány 1/A Budapest (Hungary)

We propose an implementation of a valley selective electronic Veselago lens, as a planar potential step in bilayer graphene. We demonstrate that low energy electrons radiating from a point source and being scattered by an appropriately oriented potential step can be focused again coherently within the same band. The phenomena is due to the negative refraction index which is a consequence of the anisotropy in the dispersion relation caused by the trigonal warping effect. We also consider an effective Hamiltonian in which the electron-electron interaction<sup>1</sup>, as well as external mechanical strain<sup>2</sup> is taken into account, and we show how this affects the focusing phenomenon. Recent studies on the electron-phonon interaction in bilayer graphene<sup>3</sup> suggest that the electrons' free path can be long enough even on room temperatures to enable the focusing.