

Seminar: Hard Condensed Matter Theory

Room: Media room, 03-431 (Staudinger Weg 9)

Time: Thursday, 28.01.2016, 14:15

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Thermoelectric conversion in disordered nanowires

Semiconductors have been employed for decades as the thermoelectric materials of choice. More recently, gated semiconductor nanowires have shown remarkable thermoelectric properties, well beyond those of standard bulk devices, and are under intense experimental investigation. Indeed, nanostructuring allows -- at least in principle -- to engineer systems capable of meeting the somewhat contradictory requirements of an ideal thermoelectric device: (i) to be a good charge and a poor thermal conductor (ii) exhibiting strong particle-hole asymmetry, (iii) which works up to room temperature and (iv) is based on non-polluting and abundant materials.

I will show that strongly disordered nanowires, where conduction takes place via phonon-assisted (Mott) hopping between localised states, act indeed as very promising thermoelectrics. In particular, I will discuss impurity band-edge transport and an asymmetric 3-terminal setup as two complementary approaches to realising flexible and performant (non-local) thermoelectric devices.

All interested are cordially welcome!