

ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ &  
ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/ CCQCN SEMINAR

**Tuesday, 29 September 2015**

**11:00-12:00**

**3<sup>rd</sup> Floor Seminar Room**

**Linear-in-temperature resistivity of doped Mott insulator at high  
temperatures as a static effect**

*Dr. Jure Kokalj*

Jozef Stefan Institute, Ljubljana, Slovenia

**Abstract**

By using the finite temperature Lanczos method (FTLM) for the Hubbard model near and at half-filling I explore the behavior of the resistivity, charge susceptibility (compressibility) and diffusion constant. These are all related via Nernst-Einstein relation. The results show that in the regime of high  $T$  and small dopings of Mott insulator, the large and linear-in- $T$  resistivity obtains a natural explanation in terms of charge susceptibility. In the bad-metallic regime charge susceptibility shows strong  $T$  and doping dependence and it approaches insulating like values with increasing  $T$ , which can in addition result in the resistivity crossing the Mott-Ioffe-Regel limit. On the other hand, diffusion constant, which is related to scattering rate, shows rather weak  $T$  and doping dependence. I further discuss the simple model capturing the bad-metallic behavior of resistivity and at length the relation to experiments.

