

Seminar on Condensed Matter Theory

Group of Theoretical Physics at the Department of Condensed Matter Physics of Charles University has a pleasure to invite you to attend the seminar

on 7 November 2018 at 14:00

at Faculty of Mathematics and Physics of Charles University, Ke Karlovu 5, 121 16 Praha 2

Lecture Hall F2



Dr. Jan Skolimowski

Jožef Stefan Institute, Ljubljana, Slovenia

Correlations and dimerization in the domain walls of triangular-lattice Mott insulator 1T-TaS₂

joined with Seminars on Magnetism (note different day, time and place)

1T-TaS₂ is a charge-density-wave (CDW) compound with a Mott-insulating ground state. The metallic state obtained by doping, substitution or pulsed charge injection is characterized by an emergent CDW domain wall network, while single domain walls can be found in the pristine Mott state. Tunneling spectroscopy reveals partial suppression of the Mott gap and the presence of in-gap states strongly localized at the domain-wall sites. Using the real-space dynamical mean field theory description of the strongly correlated quantum-paramagnet ground state I will show that the local gap suppression follows from the increased hopping along the connected zig-zag chain of lattice sites forming the domain wall, and that full metallisation is preempted by the splitting of the quasiparticle band into bonding and antibonding sub-bands due to the structural dimerization of the wall, explaining the presence of the in-gap states and the low density of states at the Fermi level.

