**THE ROLE OF FRUSTRATION AND INHERENT DISORDER IN THE FORMATION OF**

**QUANTUM SPIN LIQUID:  EVIDENCE FROM ELECTRONIC PROPERTIES OF ORGANIC MOTT INSULATORS**

**M. Pinteric1,2, P. Lazic3, A. Pustogow4, T. Ivek1, O. Milat1,B. Gumhalter1, M. Culo1, D. Rivas Gongora1, M. Kuvezdic1,5, M. Basletic5,B. Korin-Hamzic1, M. Dressel4, S. Tomic1**

 *1Institut za fiziku, P.O.Box 304, HR-10000 Zagreb, Croatia*

*2Faculty of Civil Engineering, Smetanova 17, 2000 Maribor, Slovenia*

*3Rudjer Boskovic Institute, Bijenicka cesta 54, HR-10000 Zagreb, Croatia*

*41. Physikalisches Institut, Universität Stuttgart, Pfaffenwaldring 57, D-70550 Stuttgart, Germany*

*5Department of Physics, Faculty of Science, University of Zagreb, P.O.Box 331, HR-10001 Zagreb, Croatia*

Molecular solids are characterized by strong electronic correlations which may give rise to charge locali­zation. Due to an odd number of electrons per unit cell they are also considered as Mott insulators. At ambient pressure and low temperatures the antiferromagnetic ordering sets in but if the frustration due to triangular arrangement of molecular pairs is high enough, magnetic ordering is suppressed and the quantum spin liquid (QSL) ground state is expected. Three organic Mott systems with different degrees of cor­relations [1] exhibit QSL ground state: (i) kappa-(BEDT-TTF)2Cu2(CN)3, (ii) kappa-(BEDT-TTF)2 Ag2(CN)3 and (iii) beta’-EtMe3[Pd((dmit)2]2 [2]. In all of them the electrodynamic response is anomalous [3-5] and its full understanding is missing primarily due to a difficulty to reconcile the idea of exotic spin-charge coupling [10] with the experimentally evidenced absence of any considerable charge imbalance [5,11]. In this presen­tation we show how the dielectric, transport, optical and structural measure­ments combined with the state-of-the-art DFT calculations provide evidence for the ground state involving several quasi-degenerate electronic states. These states reflect a random domain structure due to inherent disorder in the non-conducting anions/cations in the nominally clean single crystals of all three systems. This disorder is coupled to triangular charge and spin arrangements which give rise to the relaxor dielectric response and hopping dc transport and symmetry reduction, and thus may favour the formation of QSL.

Single crystals provided by: J. Schlueter, K. Miyagawa, K. Kanoda, T. Hiramatsu, Y. Yoshida, G. Saito and R. Kato.

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