

Abstract Submitted  
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**Inelastic electron tunnelling and noise spectroscopies in organic magnetic tunnel junctions with PTCDA barrier** FARKHAD ALIEV, ISIDORO MARTINEZ, Universidad Autonoma de Madrid, Spain, JHEN-YONG HONG, National Taiwan University, Taiwan, JUAN PEDRO CASCALES, PABLO ANDRES, Universidad Autonoma de Madrid, Spain, MINN-TSONG LIN, National Taiwan University, Taiwan — The influence of internal barrier dynamics on spin, charge transport and their fluctuations in organic spintronics remains poorly understood. Here we present inelastic electron tunnelling spectroscopy (IETS) and low frequency noise (LFN) studies in magnetic tunnel junctions with thin (1.2-5nm) organic PTCDA barriers in the tunnelling regime at temperatures down to 0.3K. Shot noise is superpoissonian with a Fano factor exceeding in 1.5-2 times the maximum values reported for magnetic tunnel junctions with inorganic barriers, indicating spin dependent bunching in tunneling [1]. IETS results show energy relaxation of tunneling electrons through the excitation of collective (librons) and internal (phonons) vibrational modes of the molecules. The bias dependence of the normalised 1/f noise studied up to 350mV reveals that the excitation of some phonon modes has a strong impact on LFN with over a 10-fold reproducible increase near some specific biases. The dependence of the IETS and LFN anomalies with the relative magnetic alignment of the electrodes will also be discussed. [1] J.P.Cascales, et al., submitted to Applied Physics Letters

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