

Avalanches in electron glasses

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Electron glasses are disordered systems of localized electron with long-range unscreened Coulomb interaction. We studied numerically the charge avalanches created by inserting an extra charge in an electron glass and found that the avalanche size has a scale-free distribution. We provide a qualitative explanation of the avalanche process in terms of the statistics of elementary dipole excitations. We then discuss the validity of a branching process description, and the relationship with avalanches observed in other systems exhibiting marginal stability. Finally, we compare the avalanches triggered by a point perturbation with those induced by a change in gate voltage in a MOSFET geometry, and analyze the experimental implications of our results. Work in collaboration with Martin Goethe.