MAR09-2008-001445

Abstract for an Invited Paper
for the MAR09 Meeting of
the American Physical Society

**Theory of Josephson junction detectors of higher order noise cumulants**[1]

HERMANN GRABERT, Freiburg Institute for Advanced Studies

A promising strategy pursued at various laboratories to measure higher order cumulants of the electrical current of nanoscopic devices employs on-chip Josephson junction detectors. The non-Gaussian nature of the noise generated by electronic nanostructures modifies the switching rate of the Josephson junction out of the zero voltage state, and the noise cumulants can be extracted from this modification. When the decay of the metastable zero voltage state occurs by noise activation to the top of the barrier of the Josephson potential, the third noise cumulant gives rise to an asymmetry of the rate when the bias current is inverted. In the range of decay by macroscopic quantum tunneling (MQT) through the barrier potential, the forth noise cumulant leads to an enhancement of the MQT rate. The theoretical methods to describe a Josephson junction noise detector in these parameter regimes are outlined and associated experimental strategies are discussed.

[1]supported by NanoScience Programme of European Research Area (ERA)