Conductance Anomalies in Transport through Quantum Dots and Quantum Point Contacts

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Quantum dots and quantum point contacts, two elementary building blocks of semiconducting nanodevices, both exhibit famously anomalous conductance features: the Kondo effect in the former case, and the 0.7-anomaly in the latter.
The microscopic origin of the Kondo effect is well established - it results from a localized spin degree of freedom that hybridizes with the delocalized conduction electrons of a metallic bath. Yigal Meir has famously argued that the 0.7-anomaly likewise originates from localized spin states leading to the Kondo effect, but others have attributed it to a presumed region of pontaneous magnetization in the point contact. I will show that these seemingly contradictory views can be reconciled by studying the spatially resolved dynamic spin susceptibility in the point contact regime.

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