Single-Electron Transistors made by chemical patterning of silicon dioxide substrates and selective deposition of gold nanoparticles
ULAS COSKUN, HENOK MEBRAHTU, Physics Department Duke University, THOM LABEAN, Chemistry Department, Duke University, GLEB FINKELSTEIN, Physics Department Duke University — We describe a method to pattern SiO$_2$ surfaces with colloidal gold nanoparticles by e-beam lithography and selective nanoparticle deposition. The method allows us to deposit nanoparticles in different shapes, including long continuous lines just one nanoparticle wide. We contact the pre-positioned nanoparticles with metal leads to form Single Electron Transistors. The Coulomb blockade pattern surprisingly does not show the parasitic “offset charges” at low temperatures, indicating relatively little surface contamination.

Ulas Coskun
Physics Department Duke University

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