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Metal-superconductor quantum phase transition in ultrathin superconducting cylinders OSKAR VAFEK, MALCOM BEASLEY, STEVEN KIVELSON, Stanford.University — We consider a metal-superconductor quantum phase transition induced by a magnetic field in a doubly connected mesoscopic sample i.e. in the geometry of a long cylinder. Since the dynamical critical exponent $z=2$, the eventual 1D quantum criticality can be accessed controllably by ϵ -expansion starting from the upper critical dimension $d=2$. We calculate the critical exponents as well as the crossover function for the conductivity and compare it with the existing data of Liu et. al. Science, 294, 2332 (2001). Finally, we discuss the nature of the quantum multi-critical point.

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