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The interplay between localization and superconductivity in ultrathin amorphous beryllium films[1] WENHAO WU, Texas A&M University, E. BIELEJEC, Sandia National Laboratories — Near the superconductor-insulator transition (SIT), quench-condensed ultrathin Be films show a highly anisotropic magnetoconductance (MC). The conductance can drop orders of magnitude in a weak perpendicular field (< 1 T). In the high field regime, $2 \sim 10$ T, the MC in a perpendicular field is positive and can vary orders of magnitude with increasing field. These features disappears when a small amount of Mn impurities are introduced. Our results indicate that superconductivity is the origin of the observed MC. We have carried out simultaneous electron transport and tunneling measurements across the SIT, which allow us to determine, *independently* and up to a constant on the order of unity, the localization length, ξ_L, and the dielectric constant, κ, for the films. We have found that, as the normal-state sheet resistance of the films at 20 K is reduced with increasing film thickness, ξ_L increases exponentially. The SIT occurs when ξ_L crosses the Ginzburg-Landau coherence length, ξ_S.

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