

Abstract Submitted
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Magnetotransport measurements in mesoscopic thin-film bismuth rings M. RUDOLPH, J.J. HEREMANS, Virginia Tech, A.J. SIGILLITO, University of Dallas — Elemental bismuth has been found to exhibit interesting quantum phenomena in high magnetic fields. The phenomena are believed to originate in strongly spin-orbit coupled states at the bismuth surface. We studied magnetotransport oscillations in bismuth thin films patterned into Aharonov-Bohm rings to access the electronic interference patterns of the surface states. Using thin films helps isolate the surface contributions and allows the fabrication of mesoscopic structures. Polycrystalline bismuth thin films (thickness < 50 nm) were grown by thermal evaporation under UHV conditions. Mesoscopic rings (diameter < 1 micron) were patterned by electron beam lithography and standard lift-off techniques. At low applied magnetic fields, low-temperature magnetoresistance measurements over the rings show quantum oscillations with several frequencies, some of which can be geometrically attributed to the Aharonov-Bohm effect. Lower frequency oscillations are also observed and will be discussed. (DOE DE-FG02-08ER46532)

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