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Title:	Doping-induced metal to insulator transition and the thermal transport properties in germanium
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Keywords:	Quantum Spin Liquids Metal-Insulator Transition Anderson-Mott insulator
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Abstract:	Motivated by the recent theoretical prediction of “Quantum Spin Liquids and the Metal-Insulator Transition (MIT) in Doped Semiconductors”[1], In this work, we have investigated for a possible spin liquid state in boron doped germanium polycrystalline samples at four different concentrations. We have realized the transition from insulating state (pure germanium) to the metallic state by doping of boron in fine steps. It is predicted that a quantum spin liquid state can appear as an intermediate phase between the metal and the Anderson-Mott insulator. Therefore a signature of spin liquid behavior in doped semiconductors can be probed by a careful and doping dependent study of thermal transport near the MIT. A spinon Fermi liquid character in this disordered and correlated phase would lead to thermal conductivity κ ~ T for low T, as predicted by theory [1]. In addition, the effect of concentration of boron doping on the electrical resistivity, carrier concentration, and thermal conductivity has been studied.
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