

Abstract Submitted
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Possible interface superconductivity with coherent quantum CDW transport and soliton condensation phase transition in heterogeneously doped ion implanted NbSe₃ single crystals¹ KALYAN SASMAL, DHARSHANA WIJESUNDERA, IRENE RUSAKOVA, WEI-KAN CHU, JOHN H. MILLER, Department of Physics and TcSUH, University of Houston, ZHONG TANG, ARNOLD GULOY, Department of Chemistry and TcSUH, University of Houston, DEPARTMENT OF CHEMISTRY AT UNIVERSITY OF HOUSTON COLLABORATION — Aharonov-Bohm quantum interference shows oscillations of period $h/2e$ in conductance *vs.* magnetic flux of CDW rings above 77 K, reveals macroscopically observable quantum behavior. CDW transports electrons through a linear chain compound all together as the Peierls gaps displace in momentum space along with the entire Fermi Sea, similar to a superconductor. The dV/dI *vs.* bias at several temps showing a significant drop in zero-bias resistance below 46 K across an ion-implanted boundary suggests possible interfacial superconductivity or a related phase transition near the boundary between ion-implanted and un-implanted regions of a CDW in NbSe₃. The data suggests condensation of solitons near the interface. Charge soliton ($\pm 2e$) dislocations could accumulate and condense near the boundary either due to injected charge from non-isoelectronic impurities or due to a sharp gradient in optimum CDW phase between the weakly and strongly pinned regions. Implanted NbSe₃ also been studied with TEM.

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