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Weak and Strong Localization Magneto-Conductance Effects in self-doped Organic Conductor PEDOT:PSS

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Abstract

Organic semiconductors are π-conjugated polymers and small molecules. One of the most studied organic conductors is poly(3 4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS). It is a heavily doped p-type organic semiconductor. An interesting feature of PEDOT:PSS is that its conductivity can be increased by up to three orders of magnitude by simple addition of a polar co-solvent. This conductivity enhancement occurs as a result of structural changes in PEDOT:PSS films, particularly by the formation of PEDOT nanocrystalline regions.

We investigated magneto-conductance (MC) in PEDOT:PSS thin films in wide temperature (1.8-300 K) and magnetic field (up to 14 T) ranges. We propose that the MC response of the system combines both the weak localization effect that takes place within the nanocrystalline PEDOT regions and the strong localization MC effect that manifests the effect of magnetic field on the electron hopping between the high-conductivity regions. Especially, at the lowest temperatures applied in the experiment, MC is dominated by the spin polarization effect that reduces the hopping probability between singly occupied sites with intra-site Coulomb correlation.

ההרצאה תתקיים ביום רביעי, ה-13.04.2022 בשעה 12:30
באודיטוריום המכון למצב מוצק, קומת כניסה
The lecture will take place on Wednesday, 13.04.2022 at 12:30
at the Solid State Institute auditorium, entrance floor
Zoom: https://technion.zoom.us/j/94321161818

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