On Mott Conductivity Exponents of Pseudo-gap Amorphous Systems

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Abstract

We Use Variable Range Hopping (VRH) Model to compute the Mott conductivity of an interacting amorphous system in an arbitrary dimension d. The characteristic feature of this interacting system is the existence of a soft gap at the Fermi energy. We found that both at low as well as high electric field, the values of the exponents characterizing the behaviour of conductivity in this interacting system are always higher than that of non-interacting ones in all spatial dimensions. We also obtain the bound (lower as well as upper) of the values of exponents in contrast to non-interacting case. Finally, this approach allows us to construct a simple form for A.C. conductivity as a function of frequency. The scaling approach adopted here to study the Mott conductivity gives one the generalised forms of the exponents from which all the previously known results can be obtained. All these may shed light to the experimental results of amorphous systems.

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