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Study of Transport Phenomenon in Amorphous $\text{Re}_x\text{Si}_{1-x}$ Thin Films on the Both Sides of the Metal–Insulator Transition at Very Low Temperatures

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In this work, we study the electrical conductivity behaviors on the both sides of the metal–insulator transition (MIT) in $\text{Re}_x\text{Si}_{1-x}$ amorphous thin films at very low temperature. In fact, our investigation re-analyzed the experimental measurements of $\text{Re}_x\text{Si}_{1-x}$ obtained by K.G. Lisunov *et al.* On the insulating side of the MIT, the electrical conductivity can be interpreted by the existence of the variable range-hopping (VRH) regime. However, on the metallic side of the MIT, the electrical conductivity is mainly due to electron–electron interactions and low localization effects.

Keywords: transport phenomena, electrical conductivity, low temperatures, variable range hopping, metal–insulator transition.