Pre-Exponential factor and hopping criterion in the Efros-Shklovskii regime[1] MIGUEL RODRIGUEZ, BONALDE ISMARDO, ERNESTO MEDINA, Centro de Física, IVIC — We address the variable-range hopping regime in the range for which the measured temperature T is of the order of the characteristic Efros-Shklovskii temperature T_{ES}. In such a range current theories imply $r_{hop}/\xi < 1$, where r_{hop} is the hopping length and ξ is the localization length, clearly in contradiction with the standard criterion for hopping conduction. We consider impurity overlap wavefunctions of the form $\psi(r) \propto r^{-n} \exp(-r/\xi)$ and include the preexponential factor of the resistivity as a logarithmic correction in the Mott optimization procedure. From the general expression derived, the standard Efros-Shklovskii law is recovered for $T << T_{ES}$; whereas an extended preexponential-dominated regime, consistent with $r_{hop}/\xi > 1$, is found for $T_{ES} \geq T$. We argue that the new expression resulting from an interplay between preexponential and exponential factors is a consistent extension of the classical Efros-Shklovskii argument.

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Date submitted: 04 Dec 2006

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