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Coulomb Correlation Effects in Variable-Range Hopping of Magnetic Polarons MICHAEL FOYGEL, South Dakota School of Mines and Technology, Rapid City, SD 57701, ANDRE PETUKHOV, SDSM&T — We study electrical conductivity due to spin polaron hopping in disordered solids with wide distributions of the localized electron energies and polaron shifts taking into account the Coulomb correlation effects. By means of the percolation theory we demonstrate that in such materials a hard polaron gap does not manifest itself while the soft Coulomb gap persists at low temperatures. As a result, the variable-range *polaron* hopping conductivity, σ, as a function of temperature, T, obeys the stretched-exponent law: $\ln(\sigma/\sigma_0) = -\left(\widetilde{T}/T\right)^p$, where $p = 4/7$ $(3/5)$ for $3D$ $(2D)$ case. It differs from the standard Shklovskii-Efros law for which $p = 1/2$. In addition, parameter $\widetilde{T}$ is shown to depend on the dispersion of the polaron shift distribution. Therefore, it decreases with the application of an external magnetic field thus leading to giant negative magnetoresistance in the variable-range hopping regime where for paramagnetic materials $p = 5/7$ $(4/5)$.

Michael Foygel
SDSM&T

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