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How important are vertex corrections in the longitudinal dc transport through multilayers of strongly correlated materials?[1] SIMON HALE, JIM FREERICKS[2], Georgetown University — In the bulk, dynamical mean-field theory has no vertex corrections to dc transport, as proved by Khurana in 1990. The proof does not hold for inhomogeneous systems like multilayers with current flow perpendicular to the layers. We examine the effect of vertex corrections on the transport for multilayered inhomogeneous devices composed of semi-infinite metallic leads coupled via a strongly correlated material barrier region. The barrier region can be adjusted from a metallic regime to a Mott insulator through adjusting the interaction strength. We use the Falicov-Kimball model because the exact expression for the vertex corrections is known and it displays a Mott like metal to insulator transition. The resistance is calculated and we find the effects of the vertex correction are relatively small manifesting in a small reduction in the resistance-area product. This as expected this reduction saturates as the barrier layer grows towards the bulk limit. Overall, the effect of vertex corrections is smaller than about 5% of the total resistance and relatively decreases.

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