Abstract Submitted
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Enhancement of the figure-of-merit in strongly correlated multilayers[1] VELJKO ZLATIC, Institute of Physics, Zagreb, JIM FREERICKS, Physics Department, Georgetown University, Washington, D.C. — A theory of charge and heat transport in inhomogeneous multilayers (ML) with correlated electrons is presented. We consider the device which consists of several strongly correlated metallic planes (channel) sandwiched between two semi-infinite Mott insulators (barriers). A driving field is applied parallel to the ML planes and the gate voltage perpendicular to the ML planes. The device is described by the Falicov-Kimball model and transport coefficients are calculated by the linear response theory using the DMFT. The device is tuned by i) increasing the correlation strength so as to enhance the slope of the local density of states in the channel-planes at the chemical potential and ii) changing the gate voltage so as to shift the position of the chemical potential with respect to the band-edge. Both effects have a large impact on the thermoelectric properties and are used to optimize the figure-of-merit, ZT, of the device. The effect of the number of planes is discussed as well. The results for the electrical conductivity, the Seebeck coefficient, the power factor, the Lorenz number and ZT are presented. Optimal tuning gives ZT $\gg 1$.

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