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Exact solution for the Frequency Dependent charge and heat Transport (and their sum rules) with dynamical mean-field theory[1] JESUS CRUZ, JAMES FREERICKS, Georgetown University — We have calculated transport properties for the Falicov-Kimball model using the Dynamical Mean Field Theory approach. The frequency dependent electrical and thermal conductivities are evaluated within linear response at finite temperature. Other important thermal properties like the thermopower and the figure of merit are also discussed. We investigate both the optical conductivity sum rule and the thermal conductivity sum rule proposed by Shastry. In analogy to the optical conductivity, the thermal conductivity sum rule can be expressed in terms of expectation values, which can be explicitly evaluated for our model. We use a hypercubic lattice for the underlying lattice for our system and the Falicov-Kimball model because it is an exactly solvable model with a phase transition from a metallic phase to a Mott insulator with respect to the U parameter. We also examine and discuss how the frequency dependent thermopower relates to its zero frequency limit.

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Jesus Cruz
Georgetown University

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