Cooling limit of a quantum thermocouple[1] MARCO ANTONIO
JIMENEZ VALENCIA, Univ de Sonora, ABHAY SHANKAR C. SHASTRY ,
CHARLES A. STAFFORD, University of Arizona — A quantum thermocouple
is investigated beyond linear response using the method of nonequilibrium Green's
functions (NEGF). Insights on the maximum cooling power and coldest temper-
ature achievable are calculated through an effective field theory of the interacting
pi-electrons which characterize molecular junctions' transport properties. The limits
on cooling are determined by the interplay of the Peltier effect and Joule heating.
Different junction couplings (such as sequential exchange and super-exchange) in
a quantum thermocouple are tested to determine the possibility of achieving the
thermodynamic limit of Carnot efficiency.

Marco Antonio Jimenez Valencia
Univ de Sonora