On the Thermoelectric Properties of Layered Cobaltates\textsuperscript{1} QIANG LI, Brookhaven National Laboratory — A study on the thermoelectric properties of layered cobaltates is presented, based on the dynamic mean field theory for strongly correlated electron systems. Electron correlation results in a crossover from coherent quasi-particle excitation at low temperature to incoherent excitation at high temperatures in cobaltates. With an extremely narrow quasi-particle bandwidth ($\hbar \omega_c$ $\sim$ 50 meV), the thermal destruction of Fermi-liquid occurs at the moderate crossover temperature $T_M$ (\sim 200 K), and suggests a new scaling for thermoelectric power $S$ of cobaltates ($S \sim kT/\hbar \omega_c \sim T/T_M$) at low temperatures. At high temperatures, the dominating incoherent excitation leads to a weak temperature dependent $S$, and electric resistivity $\rho$ approaches the Mott-limit $\hbar a/e^2$ $\sim$ a few m\Omega\cdot cm for cobaltates, where $a$ is a lattice constant.

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