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Applied physics on strong correlations

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An important goal of condensed matter theory is to contribute to the development of higher thermoelectric materials, and given the advances in our capabilities to describe materials from first principles, it is likely that eventually success stories will be found. In this talk, I will describe some of my own attempts in that direction, considering first thermoelectricity of materials near a Mott transition, and near a quantum critical point. We will first discus the concepts briefly the computational tools available. We will argue, on empirical grounds and with some theoretical justification, that we should search for optimal thermoelectricity in correlated materials, in systems that display "SuperMottness", and we will substantiate this point with examples drawn from the titanites and the cobaltates.

[1] G. Palsson and G. Kotliar, Phys. Rev. Lett. **80**, 4775-8 (1998) .
[2] V. S. Oudovenko and G. Kotliar, Phys. Rev. B **65**, 075102 (2002)
[3] I Paul and G. Kotliar Phys. Rev. B **67**, 115131 (2003)
[4] I Paul and G. Kotliar Phys. Rev. B **64**, 184414 (2001)
[5] D. D. Sarma, S. Barman, H. Kajueter, and G. Kotliar, Europhys. Lett. **77**36, 307-312 (1996).
[6] C. A. Marianetti, G. Kotliar, Phys. Rev. Lett. **98**, 176405 (2007).