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**Destabilizing Mott insulators with currents: theory and application to $Ca_2RuO_4$**[1] GIULIANO CHIRIACO, ANDREW MILLIS, Columbia University — Nakamura, Maeno et al. (Scientific Reports, 2013) showed that under an electric field ($\sim 40\,\mathrm{V/cm}$), the metal insulator transition temperature decreases, so that $Ca_2RuO_4$ remains metallic at temperatures well below the equilibrium transition temperature. They further showed that this phenomenon is not due to the Joule heating, and argued that it arose from a nonequilibrium correlation effect. In this work we investigate the issue theoretically, using a one dimensional density wave model and considering Zener tunnelling and in-band and interband relaxation processes. Boltzmann-type transport equations are derived for conduction and valence band, including photon (up to quadratic order) and phonon relaxation terms. Even for modest fields a substantial population imbalance may be induced and consequently destabilize the gap. This work is supported by the NSF DMR 1308236 grant.

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