

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Nonlinear conduction phenomena in the Mott insulator Ca_2RuO_4 RYUJI OKAZAKI, YASUO NISHINA, YUKIO YASUI, ICHIRO TERASAKI, Department of Physics, Nagoya University, FUMIHIKO NAKAMURA, YUSAKU KIMURA, MARIKO SAKAKI, TAKASHI SUZUKI, ADSM, Hiroshima University — The 4d-electron Mott insulator Ca_2RuO_4 has attracted considerable attention because of its rich electronic states dramatically varied by temperature change, pressure, and isovalent Sr substitution. Recently, Nakamura *et al.* reported an intriguing result of current-voltage characteristics in Ca_2RuO_4 and found an E -induced insulator-to-metal transition caused by relatively low electric field $E \sim 50$ V/cm [1]. In this study we investigate the nonlinear conduction phenomena in the Mott insulating phase of Ca_2RuO_4 with a proper evaluation for self-heating effects. By utilizing a non-contact infrared thermometer, sample temperature was accurately determined even in the presence of large Joule heating. The resistivity shows a typical insulating behavior featured by thermal activation with an energy gap, but clearly depends on the applied currents. The result is highlighted by a strong suppression of the energy gap by the electrical currents. A striking similarity to the current dependence of charge-order gap in organic insulators is discussed in terms of the nonequilibrium phase transition.

[1] F. Nakamura *et al.*, (submitted).

Ryuji Okazaki
Department of Physics, Nagoya University

Date submitted: 07 Nov 2011

Electronic form version 1.4