Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Extreme electron-phonon coupling in magnetic rubidium sesquioxide ROBERT DE GROOT, Rijksuniversiteit Groningen, JISK ATTEMA, Radboud University, S. RIYADI, GREAME BLAKE, Rijksuniversiteit Groningen, GILLES DE WIJS, Radboud Univerisity, THOMAS PALSTRA, Rijksuniversiteit Groningen — Rb_2O_3 is a black, opaque oxide. Early work suggests that the stability range of the sesquioxide phase in the rubidium-oxygen phase diagram is rather broad. Rb_2O_3 remains cubic down to the lowest temperature measured (5 K). The oxygens form dumbbells with interatomic distances in between those of peroxide and superoxide anions, and strong athermal motion persists down to low temperatures. [1] Electronic-structure calculations show that the dynamics at low temperature is caused by 6 phonon modes of zero frequency, which induce a very strong electron-phonon interaction. The softness of half of these modes is suppressed by the application of pressure. Calculated using the average oxygen positions, rubidium sesquioxide is a half-metallic ferromagnet. [2]
[1] CR CHIM (11-13): 591-594 NOV 1999
[2] JACS 127 (46): 16325-16328 NOV 23 2005

Gilles de Wijs
Radboud University

Date submitted: 19 Dec 2007 Electronic form version 1.4