Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Nuclear magnetic resonance at pressures of up to 10.1 GPa detects an electronic topological transition in aluminum metal JÜRGEN HAASE, THOMAS MEISSNER, Faculty of Physics and Earth Science, University of Leipzig, Germany, SWEE K. GOH, Cavendish Laboratory, University of Cambridge, United Kingdom, MANUEL RICHTER, KLAUS KOEPERNIK, HELMUT ESCHRIG[1], Leibniz Institute for Solid State and Materials Research Dresden, Germany — We present high sensitivity ^{27}Al nuclear magnetic resonance (NMR) measurements on metallic aluminum under high pressures of up to 10.1 GPa. The measured Knight shift and spin-lattice relaxation rate indicate an unexpected negative curvature in the pressure dependence of the electronic density of states (DOS) that violates a free electron behavior. Based on a careful analysis of the Fermiology of aluminum metal with numerical LDA calculations we attribute the observed change in the DOS to a pressure induced electronic topological transition. We discuss an unexpected increase of the NMR linewidth above 4.2 GPa that is not in agreement with the metal's cubic symmetry.

[1]deceased

Jürgen Haase
Faculty of Physics and Earth Science, University of Leipzig, Germany

Date submitted: 27 Nov 2012 Electronic form version 1.4