

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Universal non-linear conductivity near to an itinerant-electron quantum critical point¹ PATRICK HOGAN, ANDREW GREEN, University of St Andrews — Quantum critical systems display universal, power-law temperature dependence in their response functions. These universal power-laws provide an experimental window upon quantum criticality. Concentrating upon conductivity in itinerant-electron systems near to a magnetic quantum critical point, we show that universal power-law dependence upon temperature is reflected in a universal non-linear conductivity; when a strong electric field is applied, the resulting current has a universal power-law dependence upon the applied electric field. For a system with thermal equilibrium resistivity proportional to T^α , we find a non-linear resistivity proportional to $E^{\alpha/(1+\alpha)}$. This provides a new experimental handle upon the physics of itinerant-electron quantum critical points.

¹This work was supported by the Royal Society and the EPSRC

Patrick Hogan
University of St Andrews

Date submitted: 20 Nov 2006

Electronic form version 1.4