

Title: Coexistence of Universal and Topological Anomalous Hall Effects in Metal CrO₂ Thin Films in the Dirty Limit

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Source: Physical Review Letters

Volume: 102 **Issue:** 22

Article Number: 227201 **DOI:** 10.1103/PhysRevLett.102.227201

Published: Jun 5 2009

Abstract: The scaling exponent of 1.6 between anomalous Hall and longitudinal conductivity, characteristic of the universal Hall mechanism in dirty-metal ferromagnets, emerges from a series of CrO₂ films as we systematically increase structural disorder. Magnetic disorder in CrO₂ increases with temperature and this drives a separate topological Hall mechanism. We find that these terms are controlled discretely by structural and magnetic defect populations, and their coexistence leads to apparent divergence from exponent 1.6, suggesting that the universal term is more prevalent than previously realized.

Document Type: Article

Language: English

KeyWords Plus: Transport-Properties; Chromium Dioxide; Temperature; Magnetotransport; Polarization

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Publisher: Amer Physical Soc

Address Publisher: One Physics Ellipse, College PK, MD 20740-3844 USA

IDS Number: 454MF

ISSN: 0031-9007

Citation: Branford W R, Yates K A, Barkhoudarov E, Moore J D, Morrison K, Magnus F, Miyoshi Y, Sousa P M, Conde O, **Silvestre A J**, Cohen L F. Coexistence of Universal and Topological Anomalous Hall Effects in Metal CrO₂ Thin Films in the Dirty Limit. Physical Review Letters. 2009: 102 (22).