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Thermal hysteresis in transport properties of chromium films due to Spin Density Wave (SDW) quantization and Domain-wall scattering RAVI K. KUMMAMURU, YEONG-AH SOH, Dartmouth College, DEPARTMENT OF PHYSICS AND ASTRONOMY, DARTMOUTH COLLEGE, HANOVER, NH 03755 TEAM — Magnetotransport measurements were made on four Cr films of thicknesses 3500^{o}A, 560^{o}A, 430^{o}A and 175^{o}A sputtered on MgO substrates. We observe thermal hysteresis in the resistivity and Hall coefficient. Two types of hysteresis are observed, one in a temperature range of tens of Kelvin above 200 K and the other from the Neel temperature down to about 50 K. The first type is seen in two of the films, 175^{o}A and 560^{o}A. By looking at the Hall conductance in the vicinity of this hysteresis, we show that it arises directly from the SDW. The second type of hysteresis is absent in the thinnest 175^{o}A film, but increases in magnitude with film thickness, and resistivity is always higher during cooling than warming. We conclude that the first type of hysteresis is caused due to discrete changes in the number of incommensurate SDW nodes due to confinement in the thickness dimension, and the second type is caused due to changes in the domain wall configuration with temperature, leading to a reduction in anti-ferromagnetic (AFM) SDW domain wall scattering.

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