

Magnetic proximity-enhanced Curie temperature of Cr-doped Bi₂Se₃ thin films: Supplementary Information

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Figure S1 shows the magnetization, M , and inverse susceptibility, $1/\chi = H/M$, as a function of temperature for different values of the applied magnetic field, H , for our as-cleaved sample, and with Co evaporated on the surface, using the same data as presented in the Arrott plots of Fig. 3. From the curves shown in Fig. S1 it is far from straightforward to determine T_C , due to unavoidable paramagnetic contributions. Ideally, measurements should take place in low field to negate this prob-

lem, however, it is then likely that the sample breaks up into a multidomain structure or that due to the magnetic anisotropy the moments are no longer aligned along the applied field. Furthermore, the magnet used to deliver the applied field can have a small remanent field. The Arrott plot criterion¹ greatly simplifies interpretation of such results, as the transition through T_C can be determined by fitting the high-field isotherms, as shown in the main text.

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¹ A. Arrott “Criterion for ferromagnetism from observations of magnetic isotherms”, Phys. Rev. **108**, 1394 (1957).

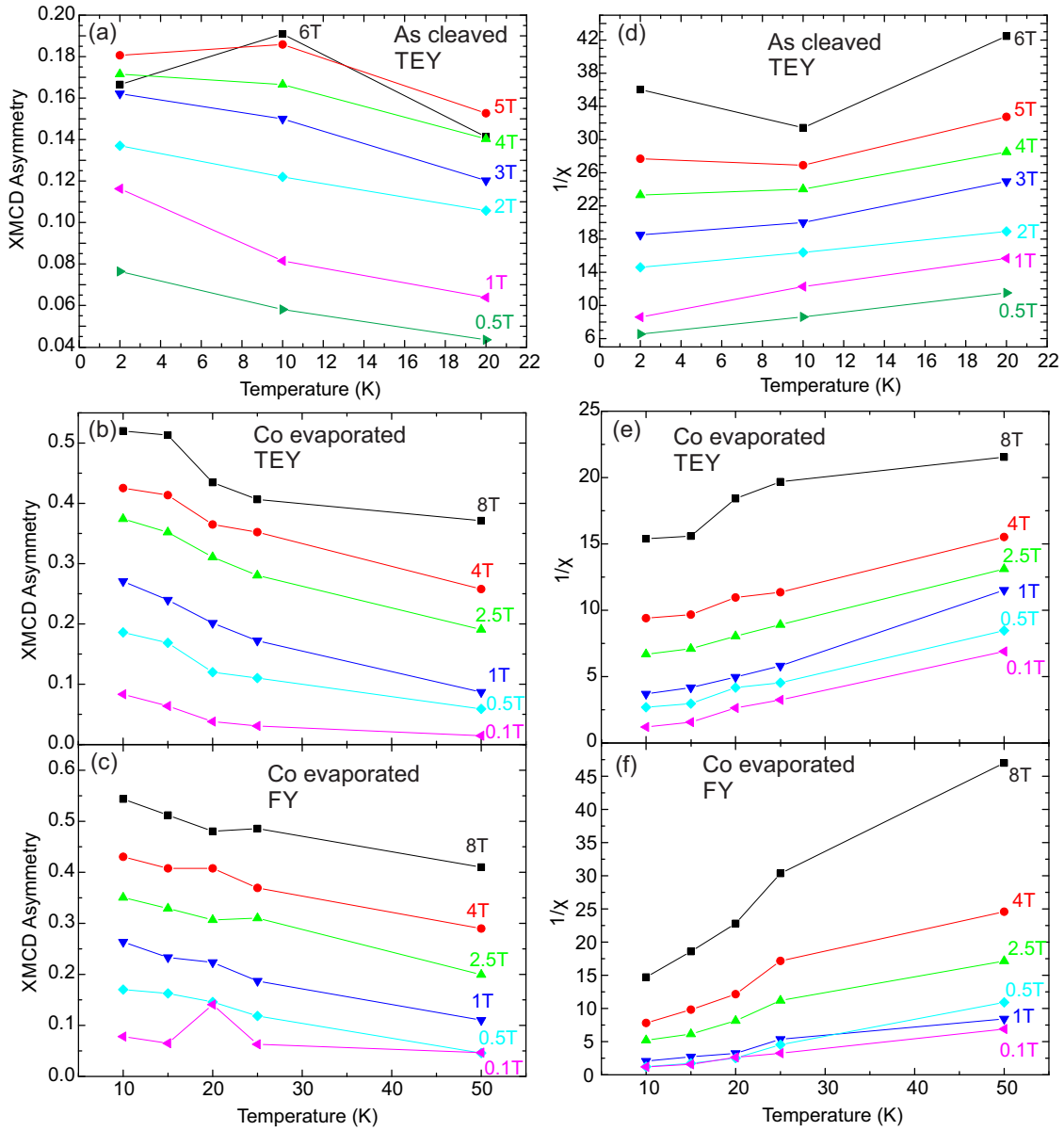


FIG. 1. *Left column:* XMCD asymmetry versus temperature for different values of the applied magnetic field, H . *Right column:* Inverse susceptibility, $1/\chi = H/M$, as a function of temperature for different values of the applied magnetic field H . The XMCD asymmetry is proportional to the magnetization, M . The various panels show the as-cleaved sample measured by total-electron yield (TEY) [(a) and (d)] and with Co evaporated on the surface as measured by TEY [(b) and (e)] and fluorescence yield (FY) [(c) and (f)]. Drawn lines are guides to the eye. The non-zero magnetization that arises from paramagnetic contributions, even far above T_C , is part of our rationale for use of the Arrott plot criterion.