

Supplementary Information for

**Current-assisted magnetization reversal in Fe₃GeTe₂ van der Waals
homojunctions**

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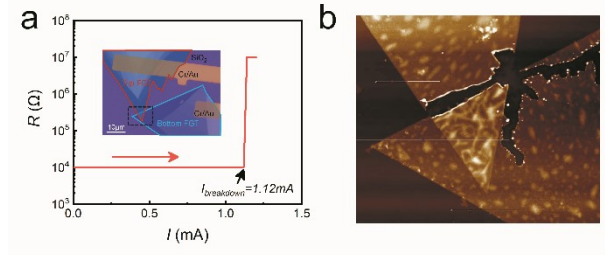


Fig. S1 The FGT/FGT homojunction damaged by a large pulse current. (a) The sample is damaged when the pulse current reaches 1.12 mA. The inset is the optical image of the sample. (b) AFM image of the sample after breakdown.

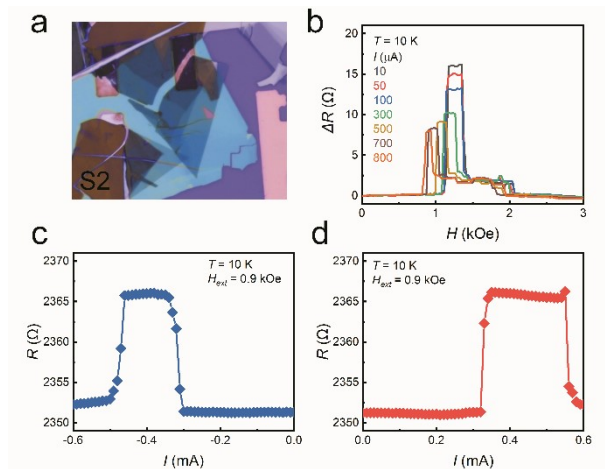


Fig. S2 The R-H curve and current-assisted magnetization reversal of sample 2. (a) The optical image of the sample. (b) The R-H curves under different bias currents at 10 K. The H_C are 1.11 and 1.41 kOe at 10 K. Magnetization reversal caused by negative (c) and positive (d) currents under a magnetic field of 0.9 kOe at 10 K.

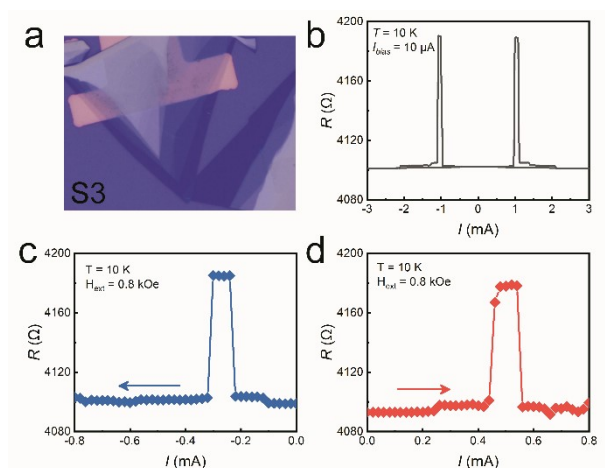


Fig. S3 The R-H curve and current-assisted magnetization reversal of sample 3. (a) The optical image of the sample. (b) The R-H curve at 10 K. The H_C are 0.99 and 1.11 kOe. Magnetization reversal caused by negative (c) and positive (d) currents under a magnetic field of 0.8 kOe at 10 K.

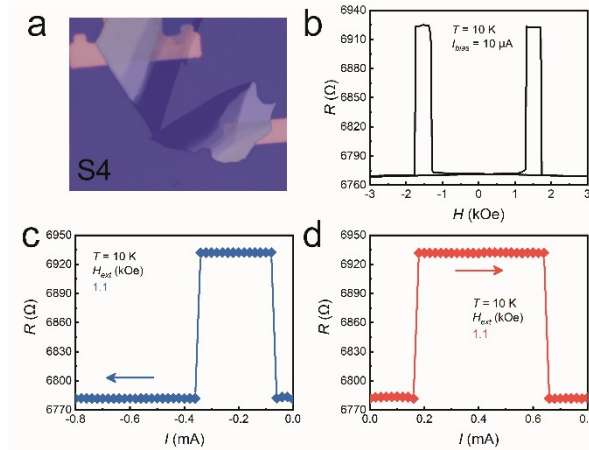


Fig. S4 The R-H curve and current-assisted magnetization reversal of sample 4. (a) The optical image of the sample. (b) The R-H curve at 10 K. The H_C are 1.32 and 1.74 kOe. Magnetization reversal caused by negative (c) and positive (d) currents under a magnetic field of 1.1 kOe at 10 K.

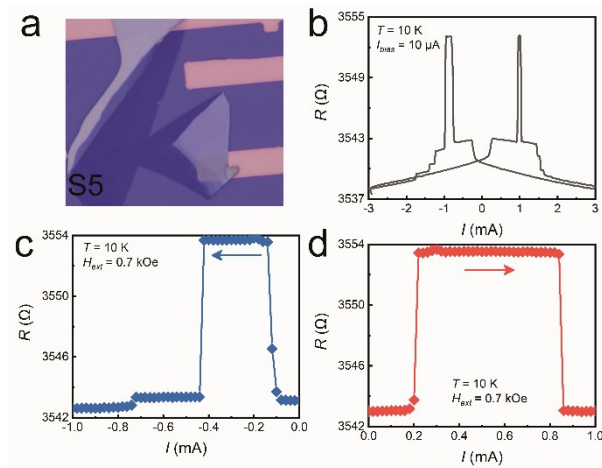


Fig. S5 The R-H curve and current-assisted magnetization reversal of sample 5. (a) The optical image of the sample. (b) The R-H curve at 10 K. The H_C are 0.96 and 1.05 kOe. Magnetization reversal caused by negative (c) and positive (d) currents under a magnetic field of 0.7 kOe at 10 K.

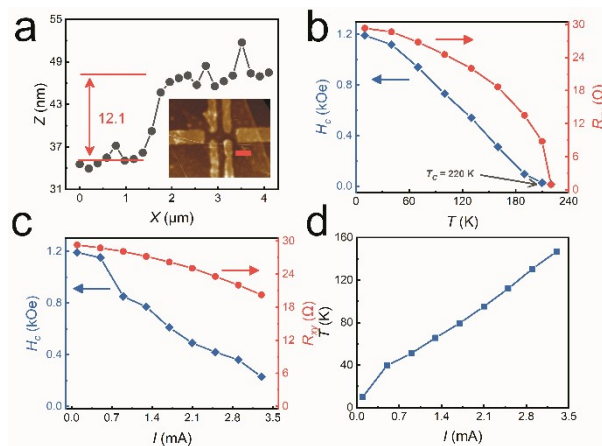


Fig. S6 H_C and R_{xy} of FGT Hall bar versus temperature and current. (a) The height profile scanned

by AFM and the inset is the AFM image of the sample. (b) The H_C and R_{xy} extracted from Fig. 3b versus temperature. (c) The H_C and R_{xy} extracted from Fig. 3c versus current. (d) After considering the Joule heat, the corresponding device temperature with applied current intensity.

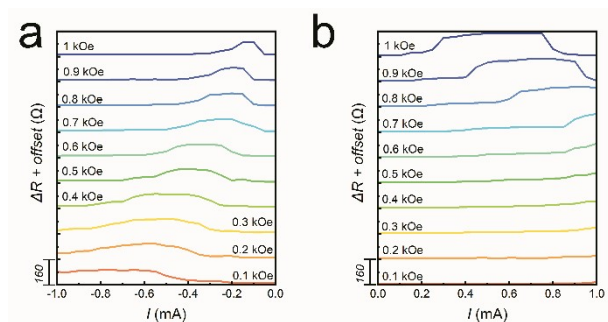


Fig. S7 Current-assisted magnetization reversal under the external H range of 0.1 to 1 kOe at 10 K. The ΔR versus the negative (a) and positive (b) pulse currents.

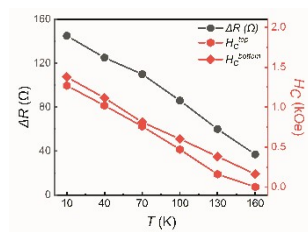


Fig. S8 The ΔR and H_C as a function of temperature extracted from Fig. 4c.

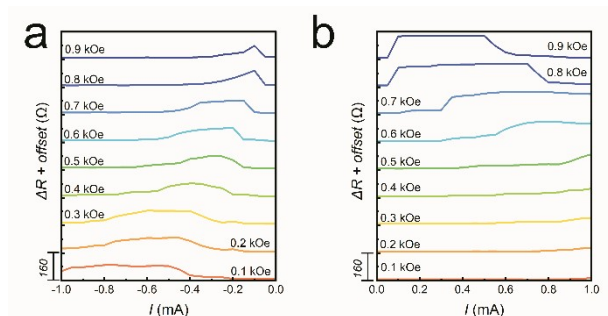


Fig. S9 Current-assisted magnetization reversal under the external H range of 0.1 to 0.9 kOe at 40 K. The ΔR versus the negative (a) and positive (b) pulse currents.

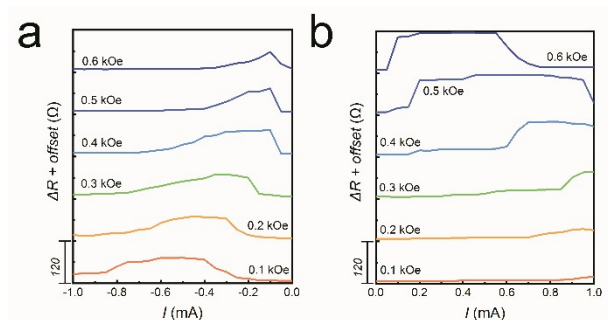


Fig. S10 Current-assisted magnetization reversal under the external H range of 0.1 to 0.6 kOe at 70 K. The ΔR versus the negative (a) and positive (b) pulse currents.

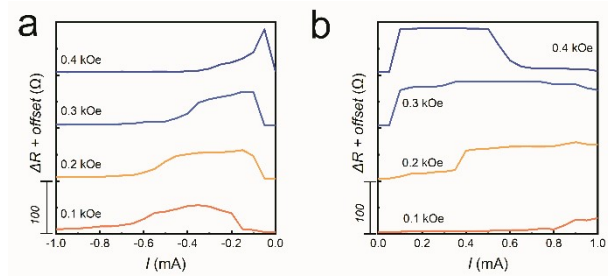


Fig. S11 Current-assisted magnetization reversal under the external H range of 0.1 to 0.4 kOe at 100 K. The ΔR versus the negative (a) and positive (b) pulse currents.

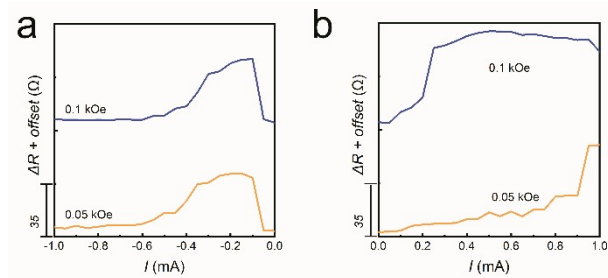


Fig. S12 Current-assisted magnetization reversal under the external H range of 0.05 to 0.1 kOe at 130 K. The ΔR versus the negative (a) and positive (b) pulse currents.