

Giant tunneling magnetoresistance in altermagnetic heterostructures via multi-stage spin-filtering

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Supporting Information

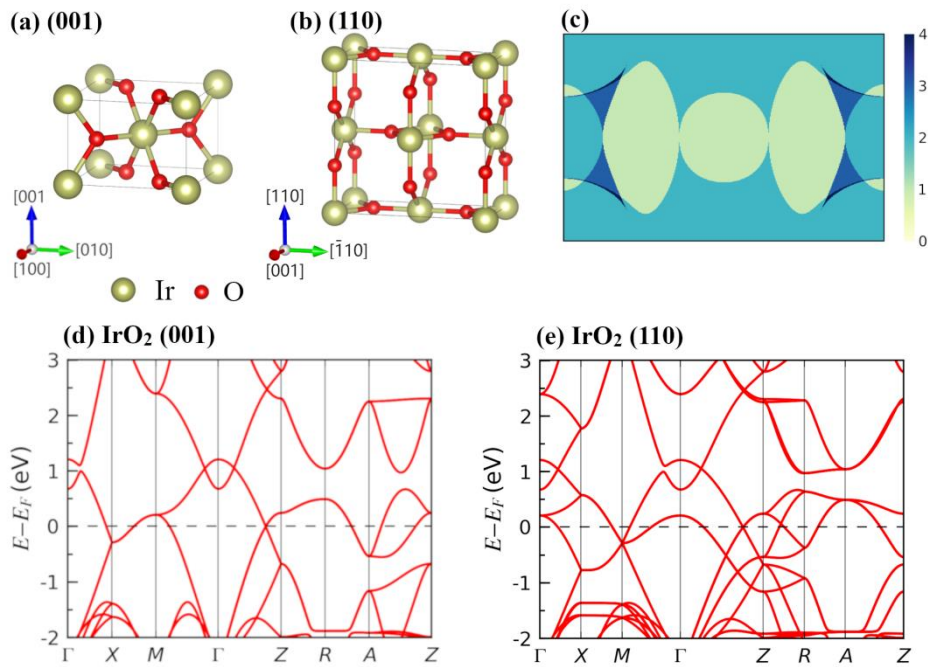


Fig. S1 Atomic structures of bulk rutile IrO_2 for the (a) (001) and (b) (110) faces. (c) Conduction channels of $\text{IrO}_2(110)$. Band structures of (d) $\text{IrO}_2(001)$ and (e) $\text{IrO}_2(110)$.

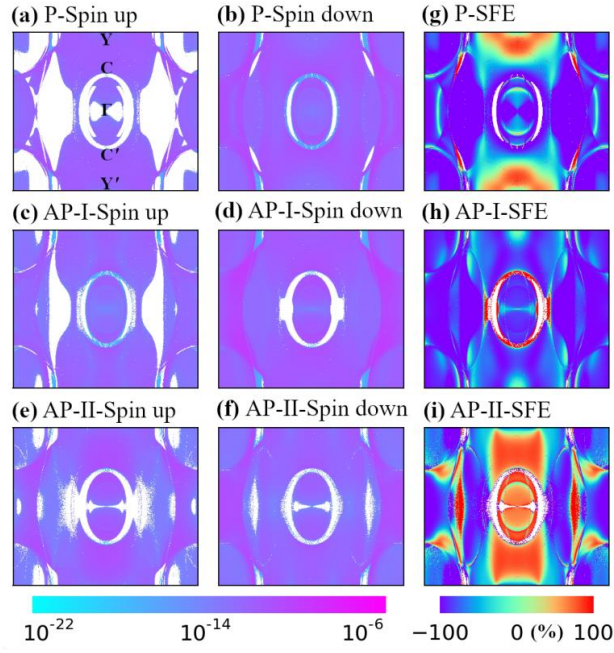


Fig. S2 $\vec{k}_{\parallel}$ -resolved transmission spectra in the two-dimensional Brillouin zone (a)–(f) of the IrO₂(110)/CoF₂/MnF₂/CoF₂/IrO₂ AMTJ, and the corresponding spin-filtering efficiency (g)–(i), defined as $SFE(\vec{k}_{\parallel}) = (T_{\uparrow}(\vec{k}_{\parallel}) - T_{\downarrow}(\vec{k}_{\parallel})) / (T_{\uparrow}(\vec{k}_{\parallel}) + T_{\downarrow}(\vec{k}_{\parallel})) \times 100\%$.

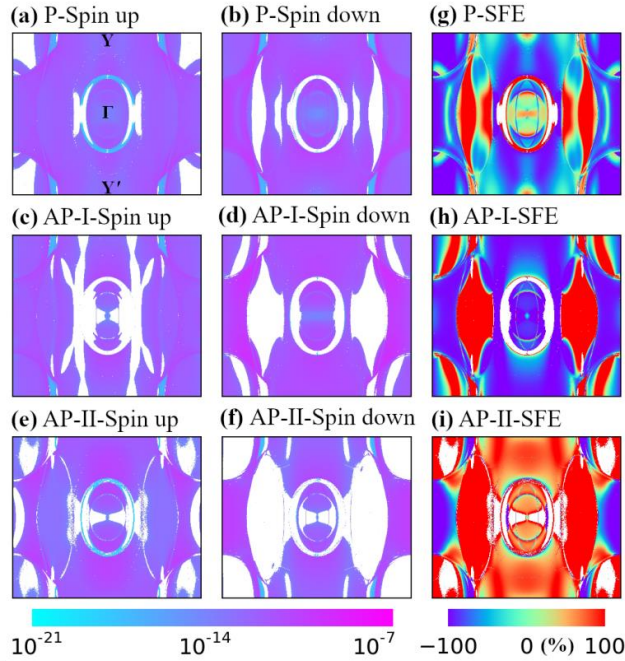


Fig. S3 $\vec{k}_{\parallel}$ -resolved transmission spectra in the two-dimensional Brillouin zone (a)–(f) of the IrO₂(110)/CoF₂/CoF₂/CoF₂/IrO₂ AMTJ, and the corresponding spin-filtering efficiency (g)–(i), defined as $SFE(\vec{k}_{\parallel}) = (T_{\uparrow}(\vec{k}_{\parallel}) - T_{\downarrow}(\vec{k}_{\parallel})) / (T_{\uparrow}(\vec{k}_{\parallel}) + T_{\downarrow}(\vec{k}_{\parallel})) \times 100\%$.