

Interface-modulating spin-valley electron beam splitter and perfect spin-valley filter in topological-insulator junction

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Supplementary Information

As shown in Figure S1, the transmittance of the spin-up current from Lead 1 to Lead 3 increases as the value of X decreases. When X is -5 , the spin-up current nearly reaches 100% transmission. This is slightly different from the perfect 100% transmission observed when X is 5 , which can be attributed to the higher concentration at the upper interface, as demonstrated in Figure 2(c) of the main text.

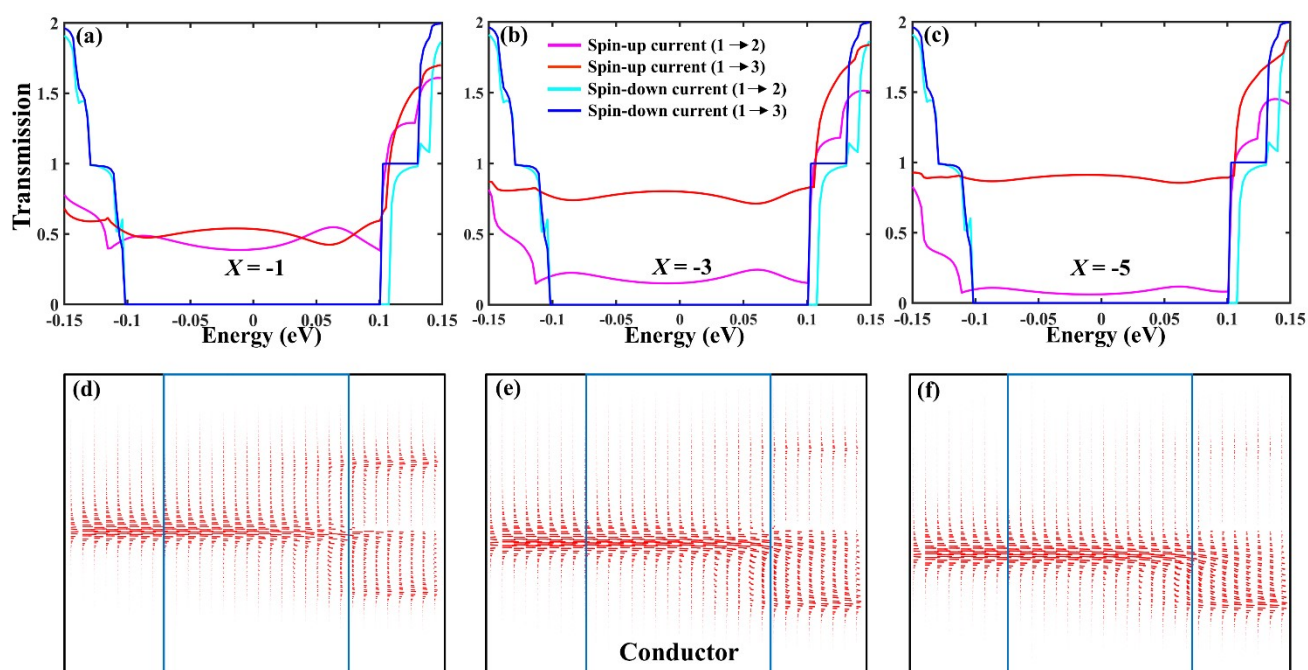


Fig. S1. The transmission spectra and local current distribution with varying interface positions. (a) Transmission spectrum for (a) $X = -1$, (b) $X = -3$, (c) $X = -5$. (b) Local bond current ($E = 0.005$ eV) for (d) $X = -1$, (e) $X = -3$, (f) $X = -5$. Red and blue indicate the spin-up and spin-down, respectively. The constants are the same as in Fig. 1.