Spin-momentum helical locking induced spin-valve effects in topological insulator/ferromagnet heterostructures\textsuperscript{1} LAN WANG, BIN XIA, CHANG KE, PENG REN, PENG LIU, HAIBIN SU, ALFRED HUAN, Nanyang Technological University — Topological insulator is composed of an insulating bulk state and an odd number of massless spin-helical Dirac cone formed two dimensional surface state. Here we report a novel spin-valve effect in Bi\textsubscript{1.5}Sb\textsubscript{0.5}Te\textsubscript{1.8}Se\textsubscript{1.2}/CoFe heterostructures. This effect indicates the spin-momentum helical locking on the Bi\textsubscript{1.5}Sb\textsubscript{0.5}Te\textsubscript{1.8}Se\textsubscript{1.2} topological surface state. It is also indicated that the characteristics of helical surface can be preserved at topological insulator/ferromagnet interface although the ferromagnetism can break the time reversal symmetry and therefore generate an energy gap at the topological Dirac cone.

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