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Electronic Transport properties of SET and REST states of interfacial phase-change memory HISAO NAKAMURA, JUNJI TOMINAGA, YOSHIHIRO ASAI, AIST, IVAN RUNGGER, AWADHESH NARAYAN, STEFANO SANVITO, School of Physcs. AMBER and CRANN, Trinity College — The phase change memory (PCM) is one of most promising nonvolatile information storage technologies. Recently, the superlattice structure of GeTe/Sb2Te3 is proposed as PCM to reduce the restive switching energy. This PCM is called interfacial PCM (iPCM) and it is considered that SET and RESET states are realized only by the flip-flop transition of Ge atoms in crystal phase because of small loss of entropy. Furthermore, the GeTe is sandwiched by Sb2Te3 topological insulator. In this study, we performed the first principles electric transport calculations including spin-orbit interactions. We presents the mechanism of resistive switch by the transition of Ge atoms as well as the volume change effect and the role of spin-orbit interaction to resistance ration of SET and RESE states.

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