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Magnetotransport properties of $Co_{90}Fe_{10}$/Cu/$Ni_{80}Fe_{20}$ pseudo-spin-valve with out-of-plane tilted magnetic field LINQIANG LUO, NAM DAO, SALINPORN KITTIWATANAKUL, STUART WOLF, JIWEI LU, Univ of Virginia, UVA NANOSTAR TEAM — The giant magnetoresistance (GMR) effect of a pseudo spin valve made of $Co_{90}Fe_{10}$/Cu/$Ni_{80}Fe_{20}$ has been investigated, with a magnetic field applied perpendicularly tilted to the sample plane. Without using a pinning layer, the magnetic separation of the free and fixed layers is uniquely achieved by utilizing perpendicular fields due to different anisotropy energies between $Ni_{80}Fe_{20}$ and $Co_{90}Fe_{10}$. The magneto-transport measurements are carried out by Van der Pauw method in current-in-plane geometry at room temperature. By tilting the magnetic field at different angles from out-of-plane, the GMR plateau's width can be tuned. A plateau width of about 2000 Oe is observed at tilted angle 0.5^o, which opens a significantly larger window for high-resistance states comparing with a plateau width of 10 Oe for in-plane fields. With the out-of-plane tilted fields, the orientation of the magnetic moments can be tuned continuously out of the sample plane, and the relative orientation between $Ni_{80}Fe_{20}$ and $Co_{90}Fe_{10}$ can also be tuned by the tilted angle, enabling us to precisely control the sample's states for current-induced spin dynamics study that is very difficult in the case of in-plane applied magnetic fields.

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