

Abstract Submitted
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Giant spin Hall effect of Au films with Pt impurities: Surface-assisted skew scattering BO GU, Japan Atomic Energy Agency, TIMOTHY ZIMAN, Institut Laue Langevin, GUANG-YU GUO, National Taiwan University, NAOTO NAGAOSA, University of Tokyo, SADAMICHI MAEKAWA, Japan Atomic Energy Agency — We show theoretically a novel route to obtain giant room temperature spin Hall effect (SHE) using surface-assisted skew scattering. By a combined approach of density functional theory and the quantum Monte Carlo (QMC) method, we have studied the SHE due to a Pt impurity in different Au hosts. We show that the spin Hall angle (SHA) could become larger than 0.1 on the Au (111) surface, and decreases by about a half on the Au (001) surface, while it is small in bulk Au. The QMC results show that the spin-orbit interaction (SOI) of the Pt impurity on the Au (001) and Au (111) surfaces is enhanced, because the Pt 5 levels are lifted to the Fermi level due to the valence fluctuations. In addition, there are two SOI channels on the Au (111) surface, while only one for Pt either on the Au (001) surface or in bulk Au.

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