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Spin Hall Angle in Gold thin films: large or small?

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Most of the methods so far adopted to determine the spin Hall angle are involved with the interface between a ferromagnetic (FM) and a nonmagnetic (NM) material, which would inevitably produce some complications in the analysis. Here, we report a new method using simply nanoscale H-pattern of gold, which is free from any interface between FM/NM, to obtain the spin Hall angle in gold thin films. A spin Hall angle around 0.1 is obtained for 10nm gold film but negligibly small for 60 nm gold. This result has not only clarified the controversy about the spin hall angle in gold thinfilm, but also proved the feasibility of using H-pattern to measure SHE in metallic system.