

Abstract Submitted
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Coherent magnetization oscillation induced by nonlocal spin injection¹ SERGEI URAZH DIN, ANDREI ZHOLUD, Emory University, VLADISLAV DEMIDOV, SERGEJ DEMOKRITOV, Muenster University — We experimentally demonstrate coherent magnetization oscillations induced by nonlocally injected pure spin current in a CoFe/Cu/Permalloy(Py) magnetic thin film heterostructure. The current injected into CoFe through a point contact is drained through the Cu spacer, while the spins diffusing from the CoFe/Cu interface to Py cause magnetic oscillations of the latter. Symmetry analysis and numeric calculations show that the current is negligible in the active region of the Py layer, and does not exceed 3 percent of the total current away from it. The oscillation frequency decreases with increasing current, and an additional spectral peak appears at large currents. Micro-focus Brillouin light scattering microscopy shows that the size of the oscillation region is larger than expected from the usual self-localization mechanism of auto-oscillation. Micromagnetic simulations suggest that the oscillation mode is localized by an effective potential well formed due to the local reduction of magnetization by the effects of spin current, providing a route for the development of spin-torque nano-oscillators with controllable spatial oscillation characteristics.

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