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Canted coherent spin states in p-Si.[1] SANDEEP KUMAR, PAUL LOU, Univ of California - Riverside — The spin waves or magnons are collective excitations of spins in magnetically ordered materials. Spin waves are considered to be the prime candidates for future energy efficient spintronics and magnonics devices. In the absence of magnetic order, the spin transport is believed to be diffusive and spin waves are not expected to exist in non-magnetic semiconductors. Here we present the first experimental proof of spin injection induced spin waves in non-magnetic p-Si. The thermally driven spin injection, also called spin-Seebeck tunneling, leads to non-equilibrium spin accumulation in p-Si. We propose that collective spin excitations or spin waves ensue in the non-magnetic materials due to non-equilibrium spin accumulation when the specimen dimension (p-Si specimen thickness of 2 m) is smaller than the spin-diffusion length. The spin excitations are confirmed from magneto-thermal transport measurement showing hysteretic thermal spin crossover behavior.

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Sandeep Kumar
Univ of California - Riverside

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