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Rabi nutations in a ferromagnetic film AMIR CAPUA, CHARLES RETTNER, IBM Almaden Res Ctr, STUART PARKIN, IBM Almaden Res Ctr, Max Plank Inst. Halle — When electromagnetic radiation interacts with a two-level system, energy is transferred back and forth between the quantum system and the electromagnetic radiation at a rate defined by the Rabi frequency. This process takes place as long as coherence prevails, until steady state is reached. Rabi nutations have been observed in a variety of quantum systems (atomic vapors, semiconductors, superconducting qubits, etc.). Here, we observe Rabi nutations in an ultrathin ˜10 Å perpendicularly magnetized CoFeB film. A hybrid ferromagnetic resonance (FMR) – time resolved magneto optical Kerr effect (TRMOKE) system is used for this observation. Namely, a strong optical pump pulse perturbs the precessing spin system after which a weak optical probe pulse is sent at different times to map its recovery until steady precessional motion is reached again. The responses at the different detunings of magnetic field away from resonance conditions readily indicate the occurrence of the Rabi nutations which are initiated by the pump arriving at t=0. Excellent agreement with the prediction given by the Rabi formula is found. The method we report presents a new approach to study dynamical phenomena in magnetic materials.

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