Karlsruher Institut für Technologie

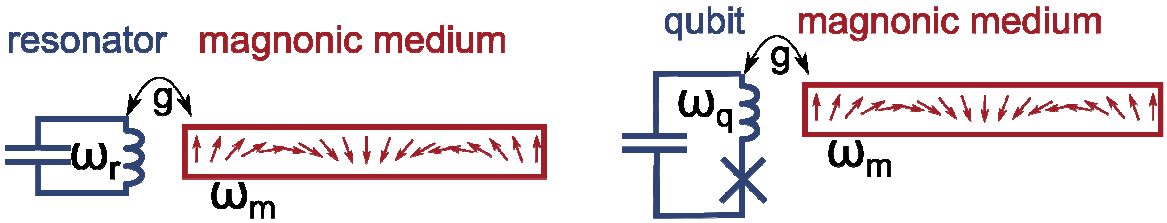
Masterarbeiten am Physikalischen Institut

Interfacing superconducting qubits with ferromagnets

We will experimentally interface ferromagnets with superconducting quantum circuits to study dynamics within the magnet. To this end, magnonic elements made up by thin, structured magnetic films will be strongly coupled to the qubit. Superconducting qubits are ideal detectors due to their quantum limited back-action on the measured object and energy resolution. Spectroscopy and coherence measurements on the hybrid system will be made in order to address fundamental aspects such as spin wave generation, detection, coherence, or wave propagation down to 10 mK temperatures and at ultra-low power (atto-watts).

The student will experimentally explore hybrid superconducting/ferromagnetic systems. She/he will learn nanotechnology, microwave setups and measurement at cryogenic temperatures.
The project connects to and extends research objects of ground-breaking nature to open up new horizons for quantum, magnon and spin electronics.

The thesis project is embedded in and connects to ongoing research in our group (http://www.phi.kit.edu/english/ustinov-research.php).



Circuit diagrams of spin wave coupled to resonator (left) and tunable transmon qubit (right). The spin wave resonance frequency can be tuned by a static in-plane field.

For more information on the project please contact
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