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Acoustomagnetic pulse experiments in LiNbO3/Mn12 hybrids
JOAN MANEL HERNANDEZ, FERRAN MACIA, ALBERTO HERNANDEZ-MINGUEZ, ANTONIO GARCIA-SANTIAGO, JAVIER TEJADA, Universitat de Barcelona, PAULO SANTOS, Paul Drude Institut, EXPERIMENTAL MAGNETISM TEAM, SEMICONDUCTOR SPECTROSCOPY COLLABORATION —
We report here that single crystals of molecular magnets like Mn12 and Fe8 mounted on the surface of piezoelectric LiNbO3 can be used as very sensitive detectors for surface acoustic waves (SAW). These SAWs are generated by sending microwave pulses in the time range between 1 μs and several tens of ms to an interdigital transducer mounted on the LiNbO3. Our experiments were carried at low temperatures and in the presence of external magnetic fields, and the analysis of the magnetization variations was done using an SQUID magnetometer with time resolution of 1 μs that allows us to study the quantum properties of these nanomagnets. The results obtained show that the variation of magnetization depends: 1) on the intensity and quality factor of the SAW at the different frequencies, 2) on whether the temperature of the experiment is above or below the magnetic blocking temperature of the molecular clusters. Furthermore, the heat released by the scattering of the coherent phonons forming the SAW contributes to the generation of the so-called magnetic avalanches. J.M. Hernandez et. al., App. Phys. Lett., (accepted).

Javier Tejada
Universitat de Barcelona

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