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Frequency Domain Magnetic Resonance Spectroscopy in Molecular Magnetism JORIS VAN SLAGEREN, University of Stuttgart — We have shown over the past years that frequency domain magnetic resonance spectroscopy (FDMRS) is excellently suited to the determination of zero-field splittings (ZFS) in molecular magnets. Among its merits are: the lack of necessity of an external magnetic field, and easy access to very large zero-field splittings. Several examples will be shown. The magnetic resonance lineshapes give information on distributions in the sample as well as excited spin state dynamics. The theoretical analysis of the origin of the cluster ZFS has shown that antisymmetric exchange interactions can play a large role. Because frequency and magnetic field are independent experimental parameters in the FDMRS technique, more sophisticated experiments can be performed. For example, we have spectroscopically studied the relaxation of the magnetization including quantum tunneling. We have also studied the dipolar interaction between single-molecule magnets using magnetic resonance measurements in solutions of various concentrations. Finally, we have shown that single molecule magnets can function as tunable radiation polarization rotators in the THz range.

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