

## **Energy Materials Research with Resonant Microwave Photons**

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Unpaired electron spins provide unique probes for studying materials that are capable of producing or storing energy. These materials include e.g. organic and inorganic semiconductor energy convertors, catalytically active transition metal ion complexes and energy storage materials. Electron paramagnetic resonance (EPR) spectroscopy is the method of choice to gain information about function-determining paramagnetic states. The Berlin Joint EPR Laboratory (BeJEL) of Freie Universität Berlin and Helmholtz-Zentrum Berlin für Materialien und Energie bundles cutting-edge experimental EPR facilities and expert knowledge available at the partner institutes for unique EPR studies in energy materials and devices. The experimental facilities include lab- and synchrotron-based EPR instrumentation for ex-situ and in-situ EPR experiments, covering excitation energies from MHz to THz frequencies. After giving an overview about the different activities within BeJEL, the presentation will focus on recent examples of energy materials research based on advanced EPR techniques. Particular emphasis will be given to materials with applications in photovoltaics, spectral conversion, thermoelectrics and catalysis.

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