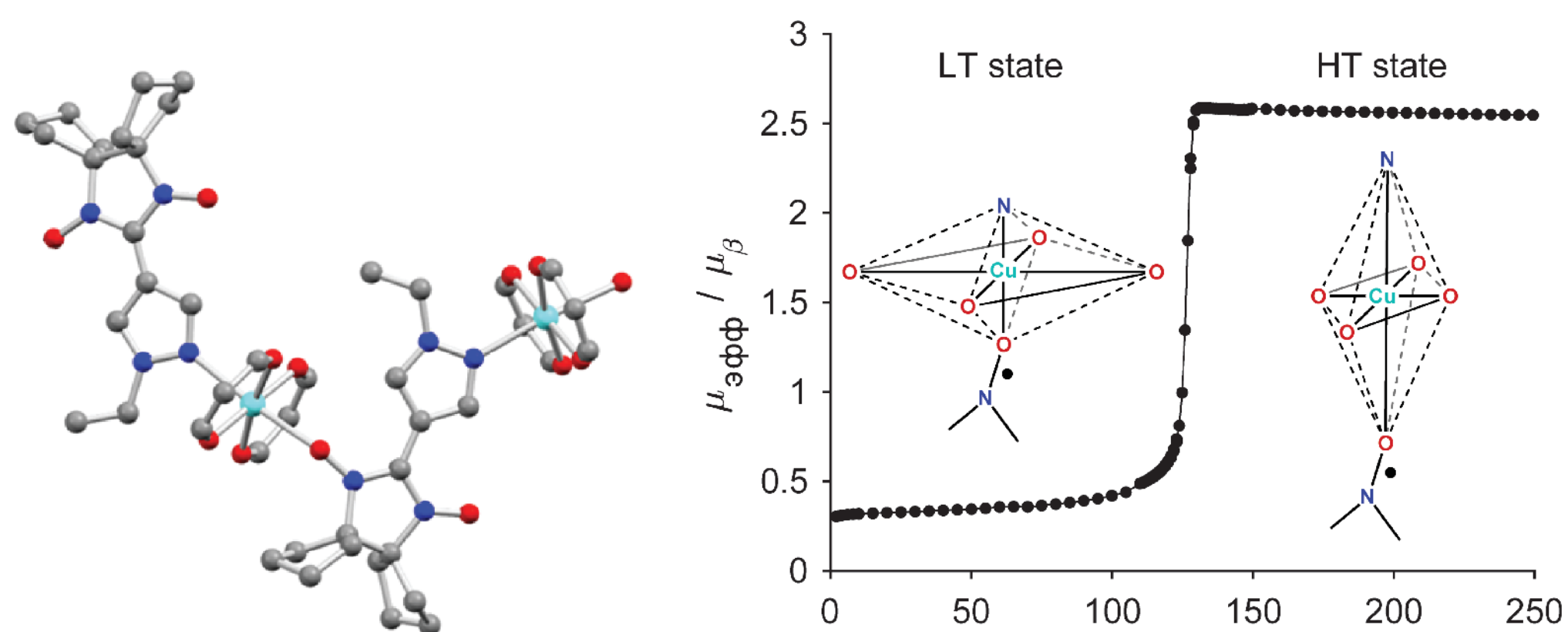


Development and Characterization of the Impulse THz Heating Method Using EPR of Magnetoactive Compounds

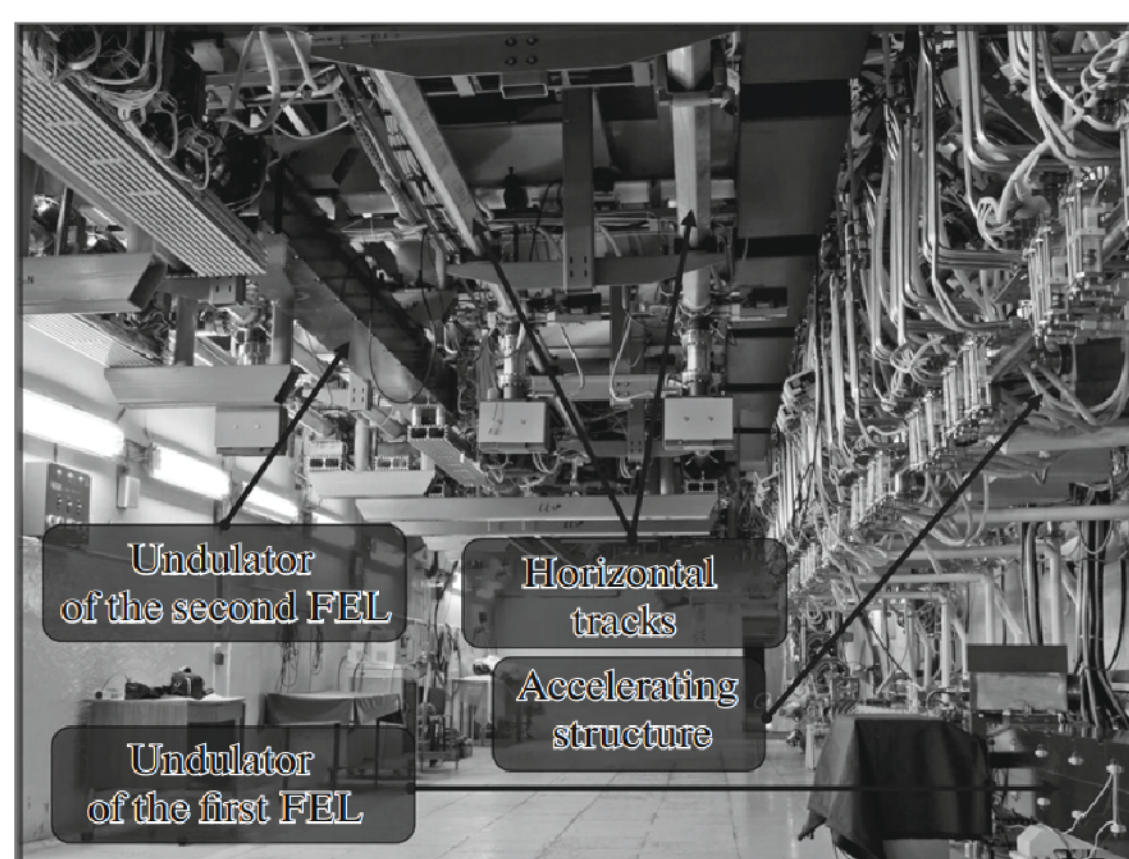
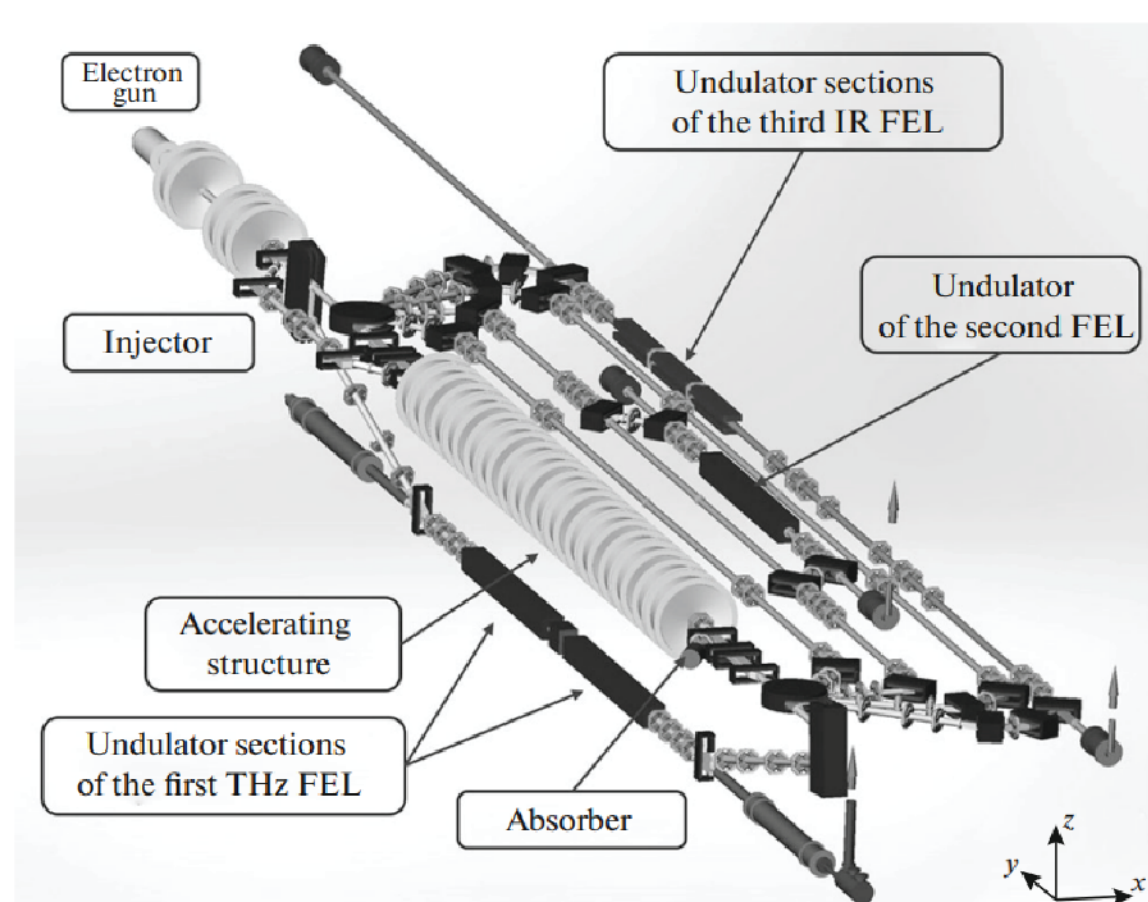
Sergey V. Tumanov, Anatoly R. Melnikov, Natalia A. Artiukhova, Artem S. Bogomyakov, Oleg A. Shevchenko, Yaroslav V. Getmanov, Victor I. Ovcharenko, Matvey V. Fedin, Sergey L. Veber

The EPR spectroscopy station at the Novosibirsk Free Electron Laser makes it possible to study the influence of THz radiation on the spin state of paramagnetic systems. Heating of the compound is inevitable due to the record power of THz radiation. The rapid heating could be harnessed for thermally induced trapping of metastable states in magnetoactive compounds and thermally activated catalytic and biological processes.

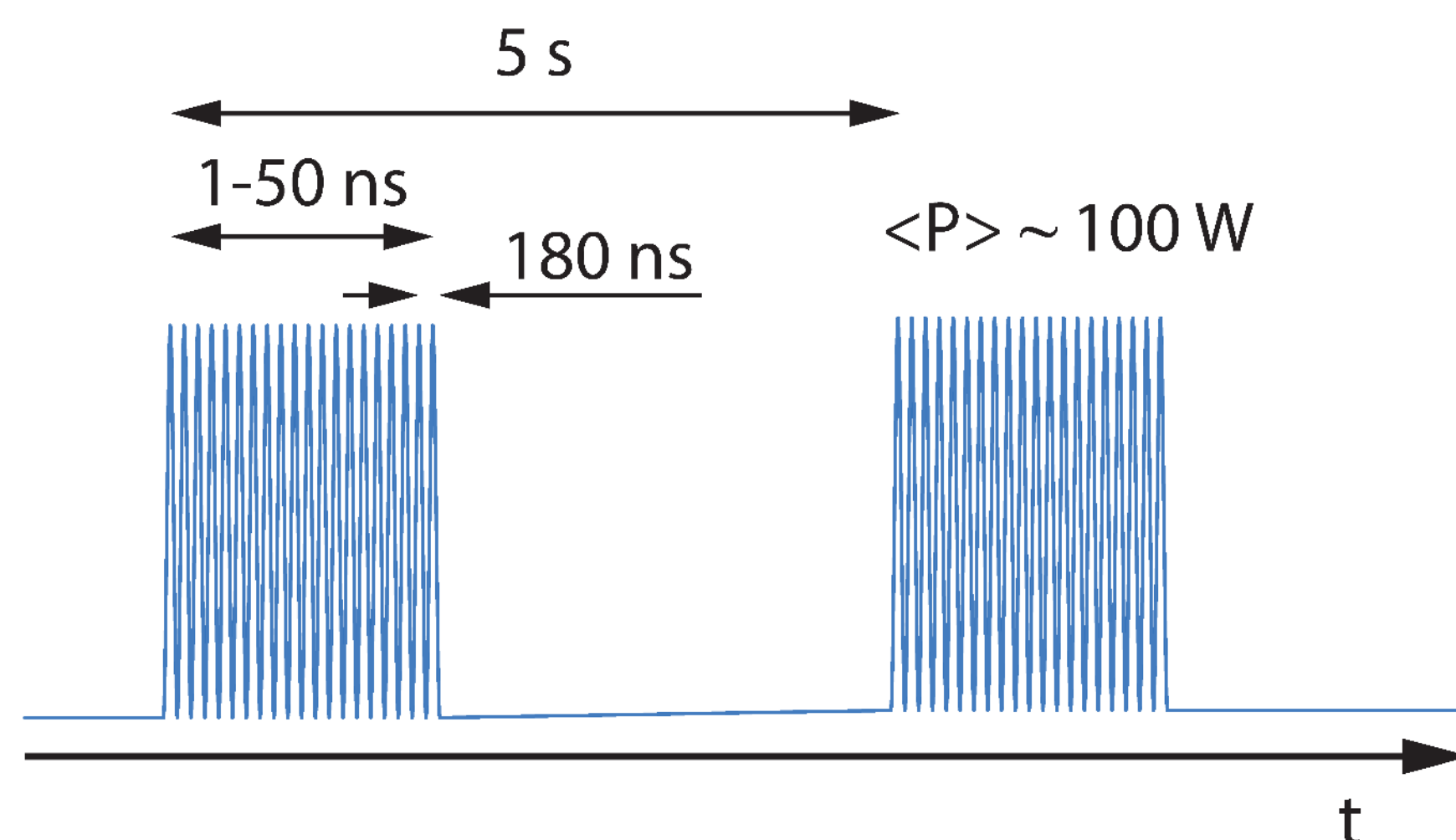
In this work, the heating process of $[\text{Cu}(\text{hfac})_2\text{L}^{\text{Et}}]$ as a model system is studied



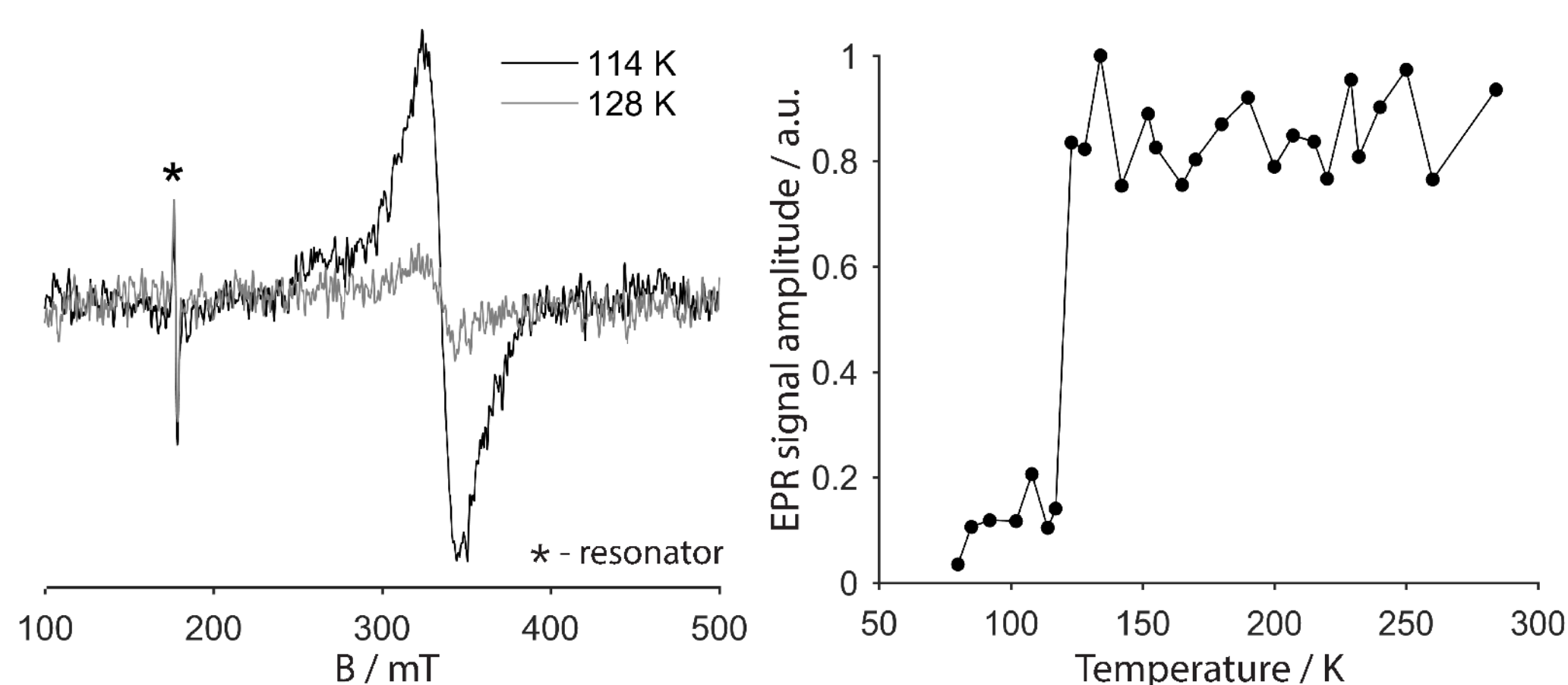
THz setup



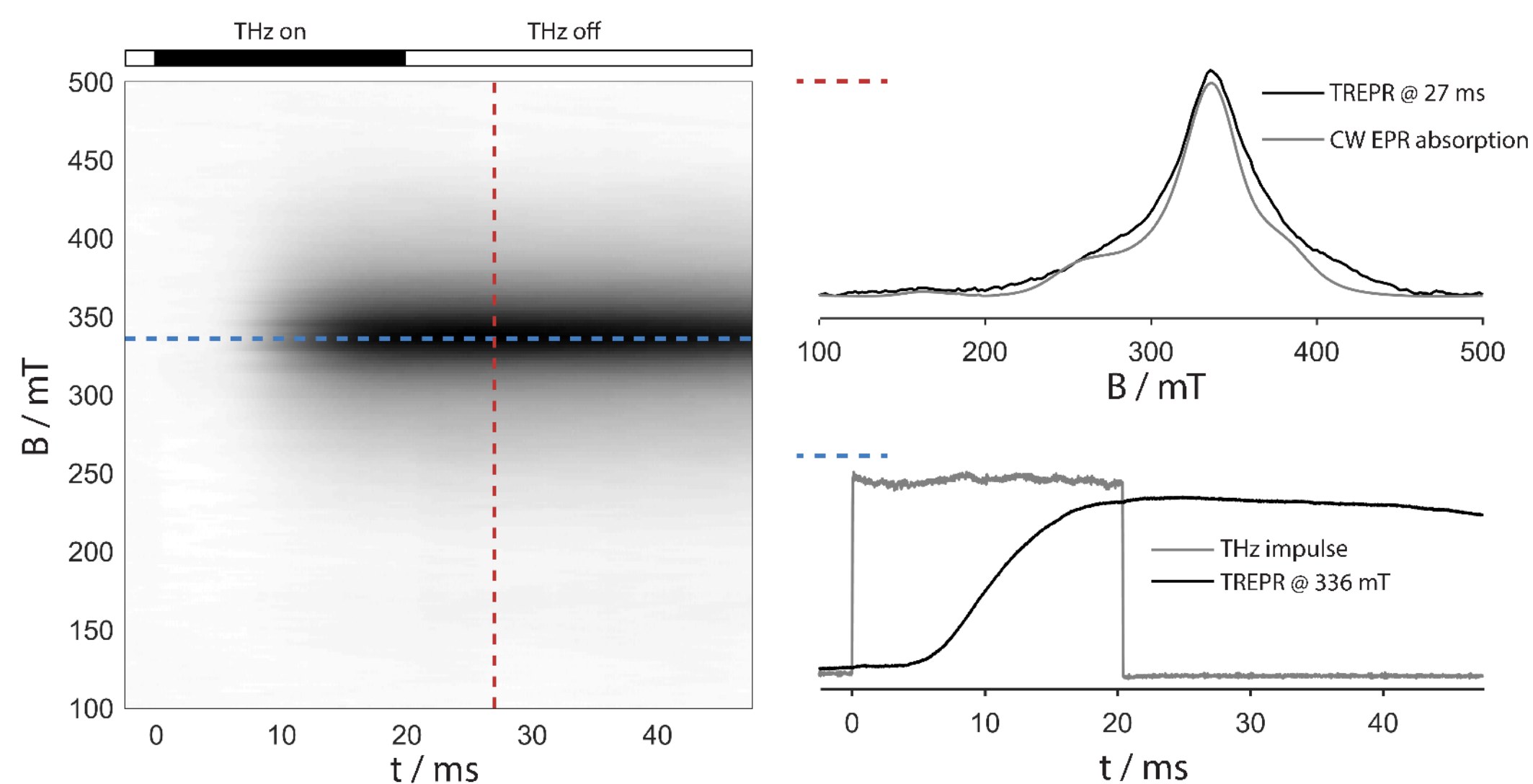
THz irradiation



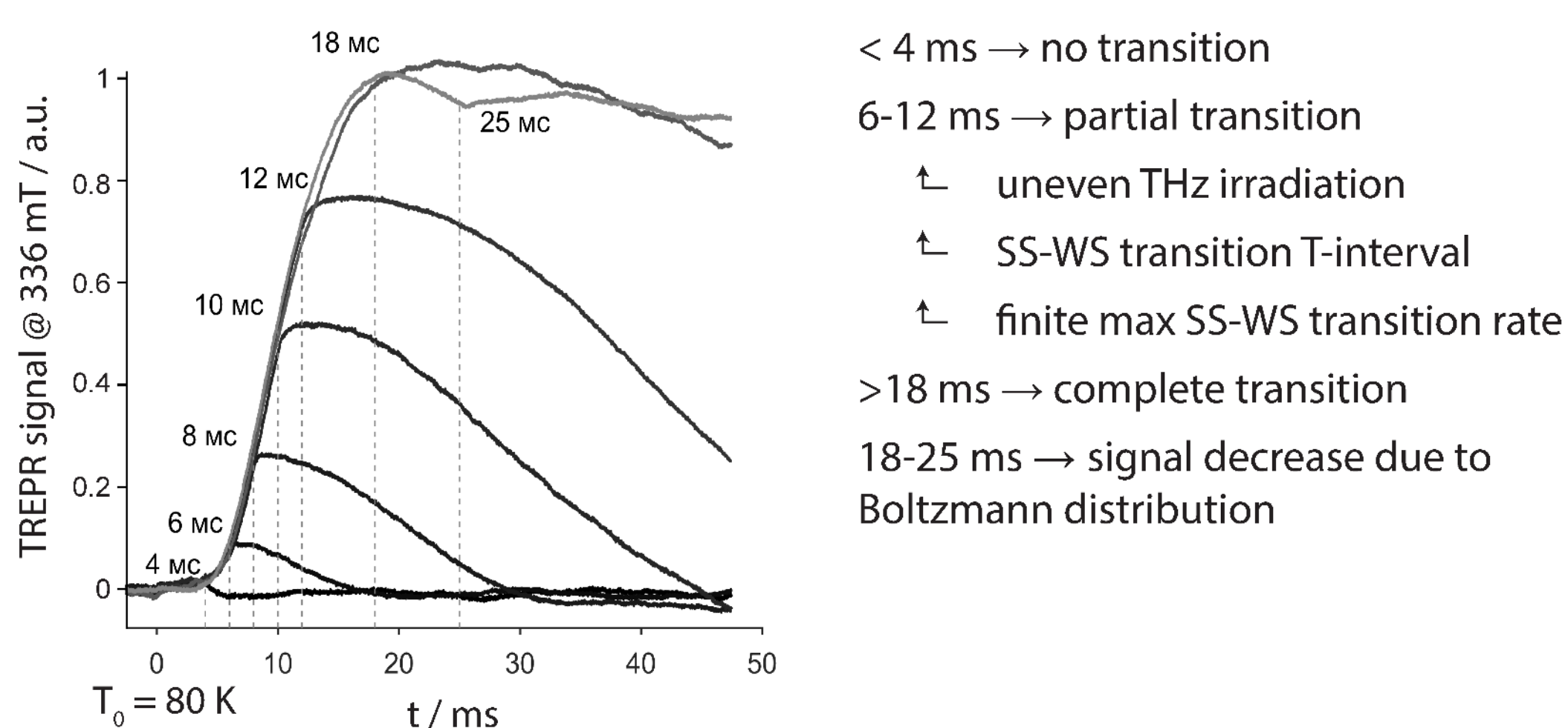
EPR of $[\text{Cu}(\text{hfac})_2\text{L}^{\text{Et}}]$: responsive temperature detection



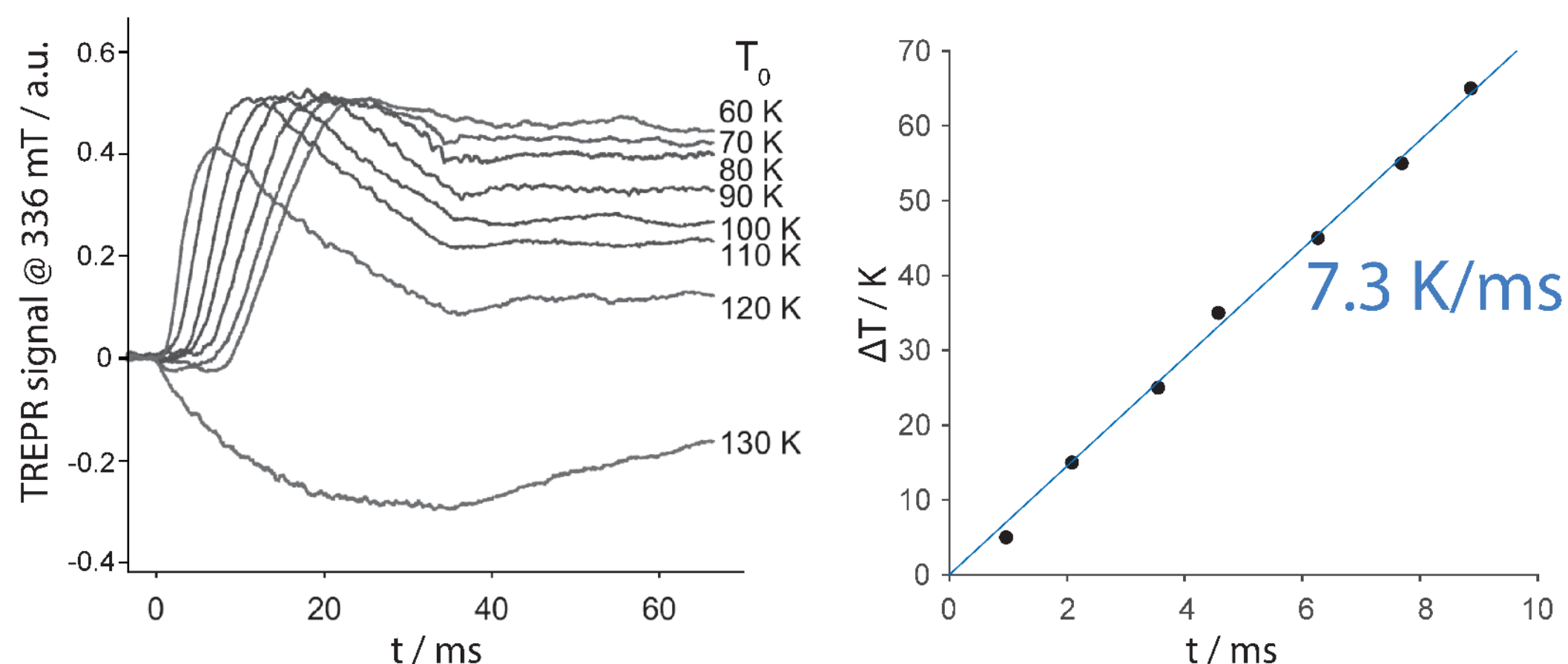
TREPR: response of $[\text{Cu}(\text{hfac})_2\text{L}^{\text{Et}}]$ to THz radiation



Dependence on THz pulse duration



Dependence on starting temperature T_0



The EPR@NovoFEL setup allows for pulsed heating with $> 60 \text{ K}$ amplitude at the 7.3 K/ms heating rate. Cooling is limited by heat transfer is on the scale of seconds



Acknowledgement

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