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Time-resolved QENS to investigate kinetically evolving samples

Neutron spectroscopy offers a unique access to diffusive properties of molecules on the nanosecond time scale. Next to structural properties, diffusive properties are also relevant for molecular interactions. In recent years, the interest in the investigation of kinetically evolving samples has been continuously increasing. While for other neutron scattering techniques, time-resolved measurements have been already well established in the past [1.], new technical and methodical developments permit now only recently to access kinetic measurements with a minute resolution in neutron spectroscopy [2.,3.].

Time-resolved quasi-elastic neutron spectroscopy (TR-QENS) can be used to investigate the diffusive properties during the kinetic transitions of the samples. In this contribution, we summarize our latest works to TR-QENS investigating samples during changes of control parameters such as temperature [4.] and time-dependencies after chemical changes in the samples including phase transitions from homogenous solutions towards protein crystals [5.,6.]. Next to the insights obtained for the individual samples investigated, the developed methods will provide new frameworks for future kinetic TR-QENS studies.

- [1.] doi: 10.1016/bs.mie.2022.08.010
- [2.] doi: 10.1016/j.nima.2011.11.090
- [3.] doi: 10.1107/S1600576724003820
- [4.] doi: 10.1021/acscentsci.2c01078
- [5.] doi: 10.1107/S160057672500353X
- [6.] doi: 10.1021/acs.cgd.9b00858

Session

Soft Condensed Matter

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