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Studying the structural dynamics of proteins by neutron and X-ray scattering

Thursday, 10 December 2020 12:00 (30 minutes)

Proteins are the molecular engines of life. Their broad range of biological tasks and functions is reflected in the large diversity of specific structural and dynamical characteristics they display on broad length and time scales. A large number of experimental techniques exist that each opens a specific window onto equilibrium and non-equilibrium protein dynamics. We will illustrate, how among those, both neutron spectroscopy [1] and crystallography at XFELs and synchrotrons [2] can be carried out in a time-resolved manner to studying non-equilibrium dynamics, although on very different time scales. As to equilibrium dynamics, the combination of selective deuteration and neutron spectroscopy is particularly powerful, as will be exemplified by solvent-free protein-polymer hybrids [3] that represent one of the many interesting subjects at the interface of life sciences and soft matter.

[1] Pounot, Chaaban, Fodera, Schiro, Weik, Seydel (2020) Tracking internal and global diffusive dynamics during protein aggregation by high-resolution neutron spectroscopy. *J Phys Chem Lett* 11: 6299

[2] Woodhouse, Nass Kovacs et al. (2020) Photoswitching mechanism of a fluorescent protein revealed by time-resolved crystallography and transient absorption spectroscopy. *Nature Communications* 11: 741

[3] Schirò, Fichou, Brogan, Sessions, Lohstroh, Zamponi, Schneider, Gallat, Paciaroni, Tobias, Perriman, Weik. Diffusive-like motions in a solvent free protein-polymer hybrid, *under revision*

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