Contribution ID: **44** Type: **Oral**

Coupling between protein and hydration water dynamics

As molecular workhorses, proteins fulfill a multitude of tasks that keep the complex machinery in biological cells alive. In order to be biologically active, most soluble proteins require their surface to be covered with water. This so-called hydration water is generally acknowledged to enable a protein to undergo the internal motions that are so fundamental for its capacity to fulfill a specific biological function. Incoherent neutron scattering (INS) in combination with selective deuterium labelling is a powerful tool that puts the focus either on protein or on water motions on the ns-ps time scale and allows their dynamic coupling to be studied. In particular, it is the translational diffusion of hydration-water molecules on the protein surface that enables functionally-relevant motions [1]. We have recently started focusing on the hydration-water dynamics of those proteins that can form the pathological fibers involved in so-called protein aggregation diseases, such as tau (Alzheimer's) and α-synuclein (Parkinson's). So far, evidence has been found that hydration water mobility is enhanced around tau amyloid fibers, a finding that identifies hydration water entropy as a potentially universal driving force behind fiber formation [2].

1. G. Schiro, Y. Fichou, F.X. Gallat et al., *Nat. Comm.* 6 (2015), 6490.
2. Y. Fichou, G. Schiro, F.X. Gallat et al., *Proc. Natl. Acad. Sci.* 112 (2015), 6365-6370.

Preferred topic

Biopolymers

Primary authors: WEIK, Martin (Institut de Biologie Structurale); SCHIRO, Giorgio (Institut de Biologie Structurale); VESTERGAARD, Bente (University of Copenhagen); SEYDEL, Tilo (Institut Laue-Langevin); HARTLEIN, Michael (Institut Laue-Langevin); ZAMPONI, Michaela (Heinz Maier-Leibnitz Zentrum); MOULIN, Martine (Institut Laue-Langevin); LANGKILDE, Annette (University of Copenhagen); FICHOU, Yann (University of California Santa Barbara); POUNOT, Kevin (Institut de Biologie Structurale)

Presenter: WEIK, Martin (Institut de Biologie Structurale)