

# High-resolution Neutron Spectroscopy to Study Picosecond-nanosecond Dynamics of Proteins and Hydration Water

Kevin Pounot<sup>1,2</sup>, Markus Appel<sup>2</sup>, Christian Beck<sup>1,2</sup>, Martin Weik<sup>3</sup>, Giorgio Schirò<sup>3</sup>, Yann Fichou<sup>4</sup>, Tilo Seydel<sup>2</sup>, Frank Schreiber<sup>1</sup>

<sup>1</sup>Institut für Angewandte Physik, Universität Tübingen <sup>2</sup>Institut Max von Laue - Paul Langevin (ILL) <sup>3</sup>Institut de Biologie Structurale, Université Grenoble Alpes <sup>4</sup>Institut Européen de Chimie et Biologie, Bordeaux INP, Chimie et Biologie des Membranes et des Nanoobjets (CBMN), Université de Bordeaux

## Corresponding Author

Kevin Pounot

kevin.pounot@uni-tuebingen.de

## Citation

Pounot, K., Appel, M., Beck, C., Weik, M., Schirò, G., Fichou, Y., Seydel, T., Schreiber, F. High-resolution Neutron Spectroscopy to Study Picosecond-nanosecond Dynamics of Proteins and Hydration Water. *J. Vis. Exp.* (182), e63664, doi:10.3791/63664 (2022).

## Date Published

April 28, 2022

## DOI

10.3791/63664

## URL

jove.com/video/63664

## Materials

Name	Company	Catalog Number	Comments
Aluminum sample holder			Not commercially available. Either the local contact on the instrument can provide them or they can be manufactured based on a technical drawing that can be provided by the local contact.
Deuterium chloride, 35 wt. % in D <sub>2</sub> O, ≥99 atom % D	Sigma-Aldrich	543047	
Deuterium oxide (D, 99.9%)	Eurisotop	DLM-4DR-PK	
Dow Corning high-vacuum silicone grease	Sigma-Aldrich	Z273554-1EA	
Ethanol 96%, EMSURE Reag. Ph Eur	Sigma-Aldrich	1.5901	
Glass dessicator	VWR	75871-660	
Glass dessicator plate, 140 mm	VWR	89038-068	
Indium wire, 1.0 mm (0.04 in) dia, Puratronic, 99.999%	Alfa Aesar	00470.G1	
Lysozyme from chicken egg white dialyzed, lyophilized, powder, ~100,000 U/mg	Sigma-Aldrich	62970	
nPDyn		v3.x	see github.com/kpounot/nPDyn, model functions for fitting also included in the software
OHAUS AX324 Adventurer balance, internal calibration	Dutscher	92641	
Phosphorus pentoxide, ReagentPlus, 99%	Sigma-Aldrich	214701	
Pipette ErgoOne 0.5-10 µL	Starlab	S7100-0510	
Pipette ErgoOne 100-1,000 µL	Starlab	S7100-1000	

Pipette ErgoOne 20-200 $\mu$ L	Starlab	S7100-2200	
Pipette tip TipOne 1,000 $\mu$ L	Starlab	S1111-6001	
Pipette tip TipOne 10 $\mu$ L	Starlab	S1111-3200	
Pipette tip TipOne 200 $\mu$ L	Starlab	S1111-0206	
Sodium deuterioxide solution, 40 wt. % in D <sub>2</sub> O, 99.5 atom % D	Sigma-Aldrich	372072	