

Abstract Submitted  
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**Quasi-Elastic Neutron Scattering: an insight into life at extreme conditions**<sup>1</sup> FABRIZIA FOGLIA, RACHAEL HAZAEL, University College London, GIOVANNA SIMEONI, TUM - FRM II, MARIE-SOUSAI APPAVOU, Forschungszentrum Jülich GmbH, FILIP MEERSMAN, University College London, ISABELLE DANIEL, Laboratoire de Géologie de Lyon, TREVOR FORSYTH, Life Sciences Group, ILL and EPSAM/ISTM, PAUL MCMILLAN, University College London — Microbes have been found to thrive in diverse environments characterised by a wide range of pressure-temperature-composition conditions. The range of physicochemical conditions under which microbial life has been observed has continually expanded as microbiologists explore additional remote and apparently hostile environments. The studies provide us with clues about the current extent of biological organisms and allow us to explore the fundamental limits to survival of bacterial life forms under extreme conditions. We are developing quasi-elastic neutron scattering (QENS) studies to help us to understand the dynamic processes associated with H-/D-containing microbes under high P conditions. We have begun our study using samples of *Shewanella oneidensis*. We obtained pioneering QENS results carried out in situ on live organisms into the 200 MPa range that provide new information on H<sub>2</sub>O/D<sub>2</sub>O exchange dynamics across the cell walls. To achieve this result we prepared D<sub>2</sub>O-substituted bacteria within the Deuteration Facility in Grenoble and transferred samples to the Munich FRM-II neutron reactor for QENS experiments at the high resolution TOFTOF spectrometer station. Our initial results show clear P dependence of H<sub>2</sub>O/D<sub>2</sub>O transfer dynamics across the bacterial cell walls.

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