

## Supporting Information: X-ray photon correlation spectroscopy of hydrated lysozyme at elevated pressures

Here we show all the individual data points, in addition to the averaged data shown in the main manuscript. The scattering intensities as a function of momentum transfer are shown in Fig. S1a. The different intensity curves for each pressure correspond to different spots on the sample. The Porod exponents  $n$  for each individual measurement for each pressure are shown in Fig. S1b.

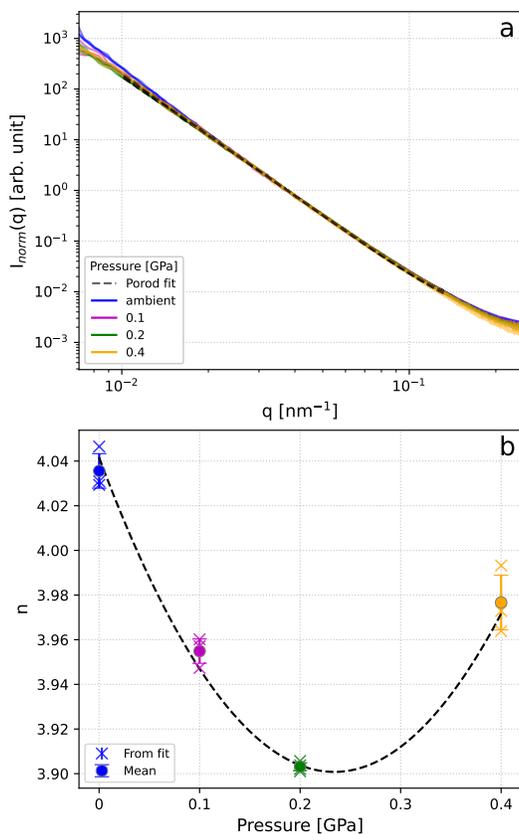


Fig. S1: (a) Scattering intensities  $I(q)$  as a function of momentum transfer  $q$  for all pressures. Each curve corresponds to an individual XPCS measurement acquired at the same nominal pressure, illustrating the measurement-to-measurement variability, which is most pronounced at 0.1 GPa. Each curve was normalized by its intensity at a reference wavevector  $q_0 \approx 0.04 \text{ nm}^{-1}$ , such that  $I_{\text{norm}}(q) = I(q)/I(q_0)$ . The dashed lines show the Porod fits and the region in which the fitting was made. (b) The Porod exponents  $n$ , where crosses with error bars denote values extracted from individual measurements, while solid circles correspond to the mean of the individual measurements with error bars showing the standard error. The dashed curve denote a parabolic fit on the mean values to highlight the general trend.

The intensity autocorrelation functions at momentum transfer value  $q = 0.07 \text{ nm}^{-1}$  for all measurements of each pressure are shown in Fig. S2a. At 0.1 GPa, the  $g_2$  functions reveal a broader distribution of relaxation rates. Specifically, some measurements resemble the ambient pressure behavior, whereas other are more consistent with the curves at 0.2 and 0.4 GPa. Because there is no pressure medium in the hydrated protein sample, local pressure variations are expected to be more pronounced compared to protein solutions. Such effects are particularly relevant at 0.1 GPa, which lies close to the lower operational limit of the DAC. A degree of heterogeneity is also observed at ambient pressure, measured in capillaries, suggesting variation in packing fraction.

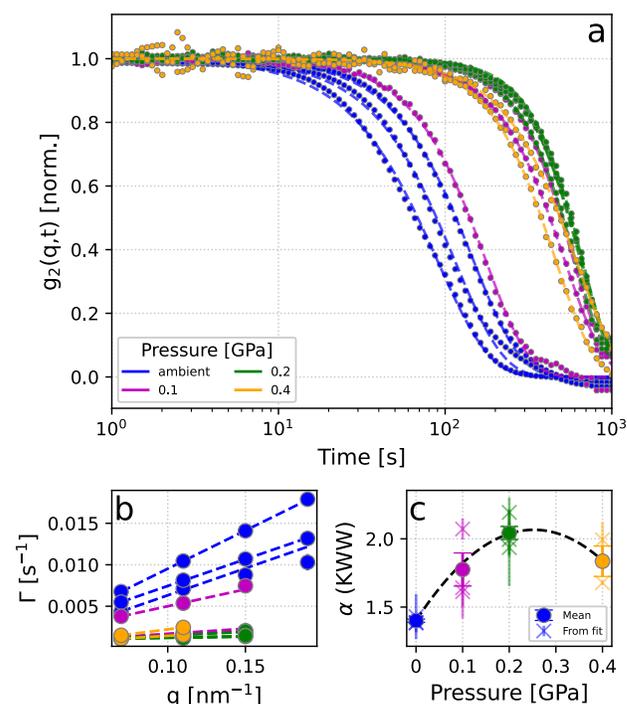


Fig. S2: (a) Intensity autocorrelation  $g_2$  functions at momentum transfer  $q = 0.07 \text{ nm}^{-1}$ , with the baseline  $B$  subtracted and normalized to the contrast  $\beta$ , for all pressures. (b) Relaxation rates  $\Gamma$  as a function of momentum transfer extracted from the  $g_2$  functions. The dashed lines denote a linear fit made to the relaxation rates. (c) The KWW exponents extracted from the  $g_2$  functions as a function of pressure. The crosses with error bars correspond to values extracted from the fit of the  $g_2$  functions while the solid circles with error bars denote the mean and standard error of the extracted values.