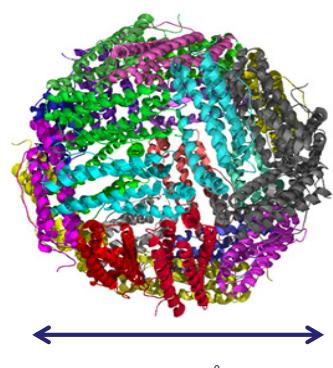
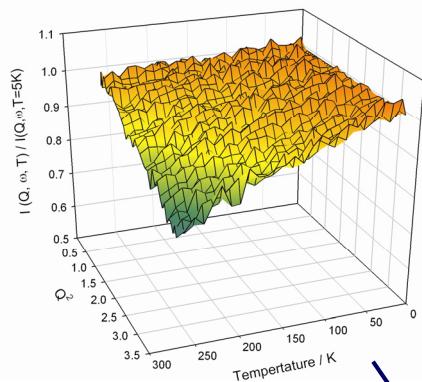


The onset of an-harmonicity in apoferritin and other lyophilized proteins as probed by OSIRIS, IRIS and IN16

^a ISIS Facility, UK, ^b Salford University, UK, ^c Institut Laue Langevin, France, ^d Heriot-Watt University, UK

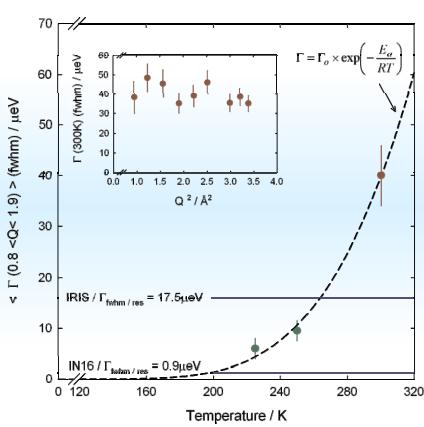
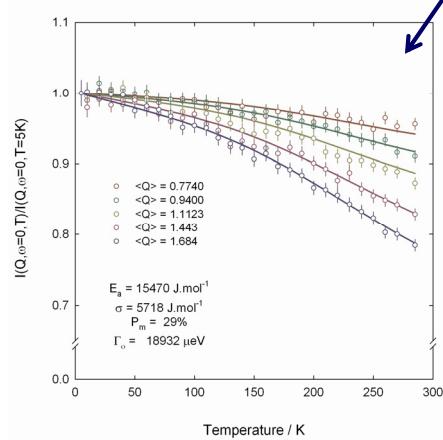
OSIRIS / IRIS

$$\begin{aligned}\Gamma_{\text{fwhm}} &= 24.5 / 17.5 \mu\text{eV} \\ t_{\max} &= 0.1 / 0.2 \text{ ns} \\ \Delta E &= +/- 400 \mu\text{eV}\end{aligned}$$



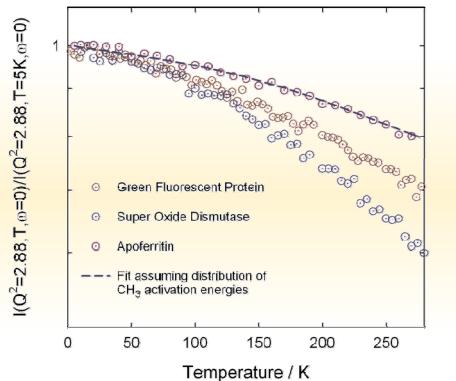
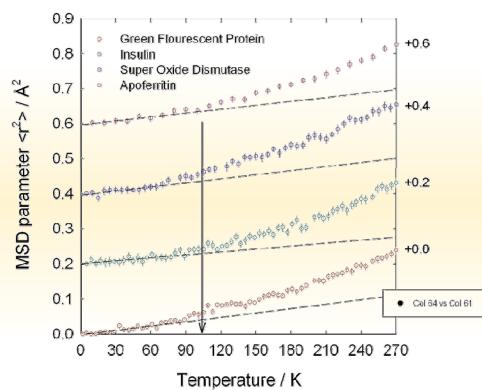
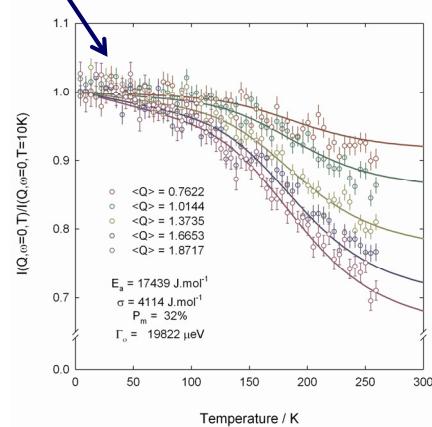
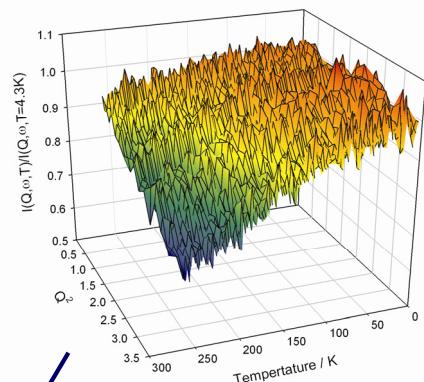
24 peptide chain, hollow, quaternary structure of apoferritin
internal diameter = 80 Å

simultaneous fit of elastic scattering data
to CH₃ jump rotation model ¹



IN16

$$\begin{aligned}\Gamma_{\text{fwhm}} &= 0.9 \mu\text{eV} \\ t_{\max} &= 2 \text{ ns} \\ \Delta E &= +/- 14 \mu\text{eV}\end{aligned}$$



¹ V. Arrighi and J.S. Higgins, *Journal of the Chemical Society-Faraday Transactions 1997*, 93, 1605