Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Measurements of Diffusion within Concentrated Bovine $\alpha$-Crystallin Suspensions**[1] NUWAN KARUNARATNE, JUSTIN BERRY[2], LARENCE LURIO, Northern Illinois University, GEORGE THURSTON, Rochester Institute of Technology, JANAE DEBARTOLO, SURESH NARAYANAN, ALEC SANDY, JOHN WEIZEORICK, Advanced Photon Source, Argonne National Laboratory — $\alpha-$Crystallin is a major protein component of the vertebrate eye lens. The chaperone-like behavior of these water soluble proteins play a key role in maintaining lens transparency by preventing condensation of other lens proteins. We report photon correlation spectroscopy measurements, both X-ray Photon Correlation Spectroscopy (XPCS) and Dynamic Light Scattering (DLS), indicating protein diffusion within suspensions of $\alpha$-Crystallin. Measurements were carried out at 2°C, 10°C and 35°C, over a wide range of concentrations from the diluted limit to the regime close to the physiological lens concentration. In the diluted regime, DLS measurements can be modeled by a single exponential fit indicating a single relaxation mode and at higher concentrations two relaxation modes can be identified by fitting the data to a double exponential decay function, a clear indication of the ploydispersed nature of the concentrated samples. XPCS measurements show dynamics at the highest concentration but cannot resolve the faster dynamics (below 20ms) at lower concentration. We also provide estimates for the viscosity of $\alpha$-Crystallin suspensions as a function of temperature and protein volume fraction using the falling ball method.

[1]NSF Grant No: DMR 0706369
[2]Presently at: Boston University School of Medicine, Boston, MA.

Nuwan Karunaratne
Northern Illinois University

Date submitted: 11 Nov 2011 Electronic form version 1.4