Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Depolarized Photon Correlation Spectroscopic Study of the Glass-Forming Liquid Cumene at Very High Pressures[1] KEVIN LYON, TIM RANSOM, WILLIAM OLIVER, University of Arkansas — In recent years full-spectrum analysis of light-scattering data has been utilized to explore the liquid-glass transition at variable temperatures and ambient pressure. We have developed methods for doing depolarized photon correlation spectroscopy (PCS) in the diamond anvil cell in order to probe directly the structural relaxation time of glass-forming liquids at very high pressures. Here we present results for liquid cumene at 25 C between 1 bar and pressures approaching the room-temperature glass transition at 2.1 GPa. Data along higher-temperature isotherms will also be presented. Methods for minimizing any undesired heterodyne component in the collected light as well as the use of the longitudinal modes of the Brillouin spectrum to aid in the acquisition and spatial filtering of the scattered light will be discussed. Intensity-intensity correlation data were found to be well represented by the KWW equation with a nearly constant stretching parameter of g = 0.66 for 25 C. Furthermore, the relaxation time as a function of pressure is described will using a modified VTF expression: $(P)=_0\exp\{DP/(P_0\text{-}P)\}$, with values of $_0$ = 11.9 ps, D = 18.6, and P_0 = 3.4 GPa at T = 25 °C. Thus, (P) has been obtained at 25 °C for Cumene over seven decades from about a microsecond to several seconds and is found to be in excellent agreement with previously determined values for the alpha relaxation at lower pressures obtained from Brillouin data [G. Li, *et al.*, Phys. Rev. Lett. **74**, 2280 (1995)].

[1]Partially supported by NSF Grant Number: DMR 0552944.

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Date submitted: 15 Nov 2013 Electronic form version 1.4