Abstract Submitted for the DAMOP06 Meeting of The American Physical Society

Aligned Molecules for X-Ray Microprobe Studies¹ E. PETERSON, C. HÖHR, S. SOUTHWORTH, E. LANDAHL, B. KRÄSSIG, E. KANTER, S. PRATT, L. YOUNG, Argonne National Laboratory, Argonne, IL 60439 — We prepare a sample of aligned molecules for experiments with 100-ps x-ray pulses at the Advanced Photon Source. Established techniques of adiabatic alignment by 10-ns pulses are not best suited for this application because of the low laser repetition rates (10-100 Hz). Instead, we choose to align adiabatically with amplified chirped pulses from a Ti:sapphire laser system (800 nm, 1.3 mJ, 120 ps, 1 kHz). In these laser-only experiments, we investigate the alignment of cold N₂ and CF₃Br molecules by detection of the charged fragments following ionization by a short (50fs) 800nm laser pulse. Molecules from a supersonic jet intersect an aligning pulse of variable linear polarization and variable delay relative to a near-colinear circularly-polarized dissociating probe pulse. The resulting ions are accelerated in a velocity-map imaging spectrometer toward a position-sensitive microchannel plate detector; the polarization dependence of this fragment distribution indicates alignment of the sample.

¹This work was supported by DOE under contract No. W-31-109-Eng-38

Emily Peterson Argonne National Laboratory, Argonne, IL 60439

Date submitted: 27 Jan 2006

Electronic form version 1.4