Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electronic relaxation dynamics in (water)$_n^-$ (n=25-100) and (CH$_3$OH)$_n^-$ (n ∼140-530) clusters via femtosecond photoelectron imaging ASTER KAMMRATH, GRAHAM GRIFFIN, UC Berkeley, JAN VERLET, University of Durham, ART BRAGG, UC Los Angeles, DANIEL NEUMARK, UC Berkeley and Lawrence Berkeley National Laboratory — Large clusters of $(H_2O)_n^-$ (n=25-50), $(D_2O)_n^-$ (n=25-100) and $(CH_3OH)_n^-$ (n ∼140-530) are studied with femtosecond time-resolved photoelectron imaging. For all three systems, the excess electron is promoted to an excited state with a pump laser pulse at 1.55 eV. Subsequent dynamics are monitored by observing photoelectrons detached after a variable delay with a probe pulse at 3.1 eV. For all three systems the excess electron is seen to decay via internal conversion back to the ground state with lifetimes of 190-130 fs for $(H_2O)_n^-$, 360-150 fs for $(D_2O)_n^-$ and 260-170 fs for $(CH_3OH)_n^-$. For all three systems, lifetime of the excited state decreases with increasing cluster size and is found to vary linearly with $1/n$. Extrapolation to the bulk yields lifetimes of 54±30 fs for H_2O, 72±22 fs for D_2O and ∼150 fs for CH_3OH.

Aster Kammrath
UC Berkeley

Date submitted: 15 Nov 2006 Electronic form version 1.4