Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

The Dynamical Transition and DNA hybridization DEEPU GEORGE, KATHERINE NIESSEN, ANDREA MARKELZ, Physics, University at Buffalo, SUNY, Buffalo, NY 14260 — Terahertz spectroscopy has contributed to the understanding of the so-called biomolecular dynamical transition [1,2], which has been related to the anharmonic motions necessary to biomolecular function. It has been established that the 220 K transition is associated with solvent dynamics. Recently there has been some evidence that correlated motions of proteins also contribute to the THz response, and possibly a lower temperature dynamical transition arises from internal molecular motions. Here we examine how the temperature dependent THz response changes upon binding of single stranded DNA polynucleotide chains. THz time-domain spectroscopy (THz TDS) transmission measurements are performed on solution phase single stranded DNA (5 bases in length) for a specific sequence GCGCG, its complement CGCGC, and the hybridized pair. Our preliminary results show that while we have consistent decrease in the net dielectric response with binding, the dynamical transition does not change.

[1] Y. He et al "Protein Dynamical Transition Does Not Require Protein Structure," Phys. Rev. Lett., vol. 101, p. 178103, 2008.
[2] F. Lipps et al "Hydration and temperature interdependence of protein picosecond dynamics," Phys. Chem. Chem. Phys. vol. 14, pp. 6375-6381, 2012.

Andrea Markelz
Physics, University at Buffalo, SUNY, Buffalo, NY 14260

Date submitted: 28 Nov 2012 Electronic form version 1.4