Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Local measurements of phase transitions in Bacteriorhodopsin membrane[1] R. PROKSCH, M.P. NIKIFOROV, S. HOHLBAUCH, W.P. KING, S. ANTORAZ CONTERA, K. VOÏTCHOVSKY, S.V. KALININ, ORNL TEAM, ASYLUM RESEARCH CO. TEAM, MIT TEAM, UNIV. IL, URBANA-CHAMPAINE TEAM, UNIV. OF OXFORD TEAM — Phase transitions play an important role in biology. Specifically the thermodynamic stability of internal membrane proteins is an important issue of biophysics. Purple membrane from Halobacterium halobium contain bacteriorhodopsin (bR), an integral protein 70-80% of whole mass is intramembraneous. There are heated debates in the field about the parameters of thermal denaturation of bR, such as the denaturation temperature, enthalpy etc. Recently, bR was proposed as a component of biomolecular electronics. Thus, reliable information about the phase transitions of supported samples of bR membranes is necessary. Phase transitions in polymer/biopolymer materials are associated with the large changes in mechanical properties of the samples. We developed the technique for the measurements of the temperature dependence of the mechanical properties with high spatial resolution. This technique is based on the measurements of the contact stiffness of the atomic force microscopy tip – sample system as a function of temperature.

[1]A portion of this research was sponsored at ORNL's CNMS by the Scientific User Facilities Division, Office of Basic Energy Sciences, U.S. DOE. A portion of this research was sponsored by Asylum Research Co.

Maxim Nikiforov
ORNL

Date submitted: 07 Dec 2009 Electronic form version 1.4