

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Direct Force Measurements on Neurofilaments: Gel Expanded to Gel Condensed Transition¹ R. BECK, J. DEEK, J.B. JONES, C.R. SAFINYA, UC Santa-Barbara — Neurofilaments (NFs)—the major cytoskeletal constituent of axons in vertebrates, consist of three subunit proteins assembled to form filaments with protruding unstructured C-terminus sidearms. Liquid crystal gel networks of sidearm-mediated NF assemblies play a key role in the mechanical while disruptions of this network, due to over-accumulation or incorrect sidearm interactions, are a hallmark of motor neuron diseases. Using synchrotron SAXS [1,2] and microscopy techniques [1,3] we report a direct force measurement of reconstituted NF-gels under osmotic pressure (P), which revealed the role of subunit sidearms on structure and interaction of NFs. With increasing P, near physiological condition, the gels undergo an abrupt nonreversible gel expanded to gel condensed transition that indicates sidearm-mediated attractions between NFs. This attraction is consistent with an electrostatic model of interpenetrating chains.

[1] J.B. Jones, C.R. Safinya, *Biophys. J.* **95**, 823 (2008);

[2] R. Beck *et al.*, *Nature Mat.* (2009) in press;

[3] H. Hess *et al.* *Langmuir* **24**, 8397 (2008)

¹Supported by DOE BES DE-FG-02-06ER46314, NSF DMR-0803103, and HFSP.

R. Beck
UC Santa-Barbara

Date submitted: 03 Nov 2009

Electronic form version 1.4