Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

High Deformability, Particle Size Distribution and Hydration of Phytoglycogen Nanoparticles BENJAMIN BAYLIS, JOHN DUTCHER, University of Guelph — We have used atomic force microscopy to resolve a large discrepancy between the size of monodisperse phytoglycogen nanoparticles measured using small angle neutron scattering (SANS) and dynamic light scattering (DLS), and to calculate the effect of hydration on the nanoparticle size. The AFM measurements are challenging because of the "stickiness" and deformability of the soft nanoparticles. By significantly reducing the interaction between the AFM tip and the "sticky" nanoparticles, we were able to obtain high quality images in both air and water. We found that the adsorbed particles are highly deformed, forming pancake-like objects on hydrophilic mica surfaces. By measuring the distribution of isolated particle volumes in air, we calculated the average effective spherical diameter of the particles. Comparing nanoparticle aggregates in both air and water allowed the determination of the hydration of an individual nanoparticle. Our results are in excellent agreement with the diameter determined using SANS, providing insight into the unusual diffusion dynamics that is measured in DLS. These measurements illustrate the distinct advantages of AFM over other imaging techniques for visualizing nanoscopic soft objects in a liquid environment.

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Date submitted: 10 Nov 2016 Electronic form version 1.4