Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

DNA-driven assembly of phospholipid bilayer nanodiscs NIENKE GEERTS, Department of Chemical Engineering, Yale University, New Haven, CT 06511, PAUL A. BEALES, Centre for Molecular Nanoscience, School of Chemistry, University of Leeds, Leeds LS2 9JT, UK, T. KYLE VANDERLICK, Department of Chemical Engineering, Yale University, New Haven, CT 06511 — Phospholipid nanodiscs are a rare form of stable lipid self-assembly. The discs are formed by allowing lipids to self-assemble in the presence of membrane scaffold proteins (MSP). Each disc contains two MSP, wrapping around the edge of a leaflet of the bilayer. Although nanodiscs have become an important and versatile tool among model membrane systems to functionally reconstitute membrane proteins, they are yet to be utilized as building blocks in material science. However their highly monodisperse nanoscale structure make them ideal for this purpose. Here we report the first superstructures of nanodiscs self-assembled via membrane anchored single stranded DNA. The discs assemble into columnar stacks with high aspect ratio. The MSPs provide another powerful feature, as the His-tags of the protein can be used to attach the discs to colloids or other molecules of interest. This has strong potential for assembly of nanomaterials with greater degrees of complexity.

Nienke Geerts
Dept of Chemical Engineering, Yale University, New Haven, CT 06511

Date submitted: 15 Dec 2010 Electronic form version 1.4