Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spontaneous curvature in chiral polar filaments near interfaces[1]
PETER D. OLMSTED, Department of Physics, Georgetown University, EMILY E. RILEY, Department of Applied Mathematics and Theoretical Physics, Cambridge University, SOPHIA JORDENS, IVAN USOV, Department of Health Sciences & Technology, Laboratory of Food & Soft Materials, ETH Zurich, LUCIO ISA, Department of Materials, Laboratory for Surface Science & Technology, ETH Zurich, RAFFAELE MEZZENGA, Department of Health Sciences & Technology, Laboratory of Food & Soft Materials, ETH Zurich — Chiral filaments (actin, DNA, alpha helical strands, ...) are ubiquitous in biology, and they frequently come into contact with interfaces or inhomogeneous environments, either in biology (e.g. actin on membranes) or use and processing of biomaterials (fibrils at solvent boundaries or nanoparticle surfaces). Recent experiments[2] have shown that amyloid fibrils can develop unusual curvatures at the air-water interface. Here we show that spontaneous curvature follows, on symmetry grounds, for chiral polar filaments placed in inhomgeneous environments such as near surfaces. We demonstrate this for simple model surface-fibril interactions, and discuss some of the implications.

[1]Financial support is acknowledged from: ETH Zurich (ETHIIRA TH 32-1), SNF (2-77002-11), and SNSF (IZK072_141955, PP00P2_144646/1, PZ00P2_142532/1).
[2]S Jordens, *et al.*, "Adsorption at liquid interfaces induces amyloid fibril bending and ring formation", *ACS Nano* (2014) `http://pubs.acs.org/doi/pdf/10.1021/nn504249x`.

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Date submitted: 14 Nov 2014 Electronic form version 1.4