Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**A theoretical and computational framework for mechanics of the cortex**[1] ALEJANDRO TORRES-SNCHEZ, MARINO ARROYO, Univ Politecnica de Catalunya — The cell cortex is a thin network of actin filaments lying beneath the cell surface of animal cells. Myosin motors exert contractile forces in this network leading to active stresses, which play a key role in processes such as cytokinesis or cell migration. Thus, understanding the mechanics of the cortex is fundamental to understand the mechanics of animal cells. Due to the dynamic remodeling of the actin network, the cortex behaves as a viscoelastic fluid. Furthermore, due to the difference between its thickness (tens of nanometers) and its dimensions (tens of microns), the cortex can be regarded a surface. Thus, we can model the cortex as a viscoelastic fluid, confined to a surface, that generates active stresses. Interestingly, geometric confinement results in the coupling between shape generation and material flows. In this work we present a theoretical framework to model the mechanics of the cortex that couples elasticity, hydrodynamics and force generation. We complement our theoretical description with a computational setting to simulate the resulting non-linear equations. We use this methodology to understand different processes such as asymmetric cell division or experimental probing of the rheology of the cortex

[1]We acknowledge the support of the Europen Research Council through grant ERC CoG-681434

Alejandro Torres-Snchez
Univ Politecnica de Catalunya

Date submitted: 11 Nov 2016 Electronic form version 1.4