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**Active Currents and Stresses on the cell surface: Clustering, Instabilities and Budding<sup>1</sup>**

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We study the contractile dynamics of a collection of active polar filaments, such as actin, on a two dimensional substrate, using a continuum hydrodynamic description in the presence of spatiotemporal noise. The steady states, characterized by a variety of phases generically consisting of a transient collection of inward pointing asters. We next study the dynamics of particles advected along these active filaments. This is relevant to the dynamics and organization of a large class of cell surface molecules. We make several predictions regarding the statistics of fluctuations of these passive advective particles which we confirm using fluorescence based experiments. We then show how such active patterning of filaments can give rise to membrane stresses leading to membrane shape deformations.

<sup>1</sup>In collaboration with Kripa Gowrishankar and Satyajit Mayor.