P.10 Active polar fluid flow in deformable droplets

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At a continuum level, the eukaryotic cytoskeleton can be modelled as an active contractile fluid consisting of filaments and motors [1]. Here, we present some examples of analytical calculations of steady state flows of an active fluid confined to a circular/spherical droplet, that result from different internal configurations. We show that in some cases a droplet of active gel can be persistently motile when embedded in a suitable external medium. We compare these to simulations of the same system with a deformable droplet boundary, to observe how the droplet shape changes in its motile states. Therefore, this provides some simple quantitative examples of how cells can migrate in confinement (for example, embedded within a gel or tissue) and how the motility and deformation will depend on various physical parameters of the system.

[1] K. Kruse et al. Phys. Rev. Lett 92(7) 078101 (2004)