

Geometry and mechanics of growing bacterial suspensions

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Densely packed colonies of growing, non-motile bacteria interact through physical contact, pushing each other out of the way as they grow. Due to the rod shaped geometry of a bacterium, short ranged nematic alignment is observed. We study the development of the nematic director in a growing colony of bacteria by modelling them as growing, inflexible rods. This allows us to identify a characteristic length scale in the director associated with highly aligned 'patches' that form within the colony. We then frame this in the context of an active nematic, observing that the growth of the bacteria plays the role of an active stress [1]. This can further be used to understand the process by which bacteria form multi-layered colonies in the early stages of biofilm development [2].

[1] Z.You, D.J.G. Pearce, A. Sengupta, L. Giomi, Phys. Rev. X, **8**, 031065 (2018)

[2] Z.You, D.J.G. Pearce, A. Sengupta, L. Giomi, Arxiv, 1811.08875 (2018)