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Pattern Formation in Growing Polar Bacteria[1] XINGBO YANG, M. CRISTINA MARCHETTI, Department of Physics, Syracuse University, DAVIDE MARENDUZZO, School of Physics and Astronomy, University of Edinburgh — We analyze a continuum model of a bacterial suspension that includes motility suppression from steric repulsion, polar alignment, and bacteria reproduction and death. Using a combination of linear stability analysis and numerical solution of the nonlinear equations, we demonstrate that the model exhibits a rich variety of emergent structures, corresponding to generic patterns seen in experiments. Motility suppression in a crowded environment gives rise to a density phase separation, regulated by the growth/death of the bacteria, as demonstrated earlier by Cates et al. [PNAS 107, 11715–11720(2010)], with spherically symmetric patterns similar to those observed in *S. typhimurium*. The addition of polar alignment yields new ring/band and swirl/spiral structures resembling those observed in *E.coli* colonies. The stationary/traveling nature of the patterns and their symmetry is classified and summarized in a phase diagram.

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