MPIDS Colloquium

MAX-PLANCK-GESELLSCHAFT

Bacterial suspensions as model active matter systems

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This talk will show that bacterial suspensions, beyond their intrinsic, dominating importance in biology, are also excellent systems to explore and test theoretical results obtained in the physics of active matter. Whether some biology is learnt from such an approach will be left to your appreciation.

I will present recent experimental results on dense bacterial suspensions obtained in the groups of Masaki Sano (University of Tokyo), Yilin Wu (Chinese University of Hong Kong), and Hepeng Zhang (Shanghai Jiaotong University. I will put them in context, situating them within our current knowledge of active matter, stressing differences and similarities. I will describe our theoretical understanding of the (often) fascinating collective phenomena observed. Particular attention will be paid to the quantitative modeling effort deployed successfully to account for the active nematics observed in the third set of results.

References:

- D. Nishiguchi, et al., 2017. Long-range nematic order and anomalous fluctuations in suspensions of swimming filamentous bacteria. Physical Review E 95, 020601(R).
- C. Chen, et al., 2017. Weak synchronization and large-scale collective oscillation in dense bacterial suspensions. Nature 542, 210.
- H. Li, et al., 2018. Data-driven quantitative modeling of bacterial active nematics. PNAS, 116, 777.

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MPIDS, Prandtl lecture hall, Am Faßberg 17, Göttingen

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