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Fluid-Structure Interaction of Bioluminescence MAZIYAR JALAAL, NICO SCHRAMMA, RAYMOND GOLDSTEIN, DAMTP, University of Cambridge — Bioluminescence (emission of light from living organisms) is a common form of communication in the ocean. Here we study the bioluminescence on a single-cell level, aiming to understand the response to mechanical stimulation. In our experiments, the cell (an alga) was immobilised via micro-pipette aspiration. We impose pressure on the cell, via a submerged impinging jet. We show that the flow-induced stress on the cell membrane results in a local elastic deformation. As a result, a series of chemical signaling events occur that eventually yields to light production in sub-cellular compartments. Besides experiments, we propose a counterpart model.

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