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Università di Roma Tor Vergata
Dipartimento di Fisica



Seminar

Friday, 26 May 2017 – h. 14.30

Aula T1 (Dipartimento di Fisica)

Prof. Roman Stocker

ETH Zurich

“Modes and motives of motility in marine microbes”

Abstract

Motility is pervasive among microorganisms from the sea. From bacteria to phytoplankton, the numerically and functionally dominant organisms of the ocean are often capable of locomotion at tens to hundreds of body lengths per second. The modes and motives of their motility are still often a mystery, and a rich area of investigation. For example, most marine bacteria swim with only a single flagellum, in a run-reverse-and-flick mode of locomotion that has escaped observation until very recently, and harbors a unique use of a mechanical instability for navigation. Equally unexplored is the role of the physical environment - chiefly turbulence - on motility. For example, even as simple a cue as the repeated overturning caused by small-scale turbulent eddies can cause a strong behavioral response in motile phytoplankton. I will provide an overview of some of the modes and motives of motility among marine microbes, and then focus on our recent observation that phytoplankton can actively respond to turbulent cues. Using laboratory experiments and a cell mechanics model, I will show that phytoplankton can actively modulate their orientational stability through subtle changes in their morphology, possibly a bet-hedging strategy to evade deleterious turbulent layers in the ocean. This recent observation significantly ‘complicates’ the task of predicting phytoplankton migrations, while at the same time revealing how exquisite the adaptations of microbes to the ocean environment are.

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