DIPARTIMENTO DI CHIMICA

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

DEPARTMENT OF CHEMISTRY
Ph.D. in Chemical and Molecular Sciences

Scientific Seminar

Navigation and memory in phototactic microorganisms

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ROOM 3 – FLOOR 1 – Department of Chemistry
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Understanding how microorganisms find their way through complex environments is a fundamental question in physics and biology. Many swimming microorganisms use light to guide their motion, allowing them to optimise photosynthesis while avoiding damaging illumination. The green microalga Chlamydomonas reinhardtii is a widely used model organism for studying this behaviour, yet it remains unclear how these cells navigate complex light landscapes. Here, we use tailored light patterns to investigate how Chlamydomonas cells navigate spatially varying environments. We show that the cells adjust their swimming direction according to local changes in light and that their navigation is influenced by a short-term memory of previous light exposure. Together, these behaviours allow the cells to move through complex light landscapes and accumulate in selected regions. Our results reveal that navigation emerges from the combination of local light sensing and memory, providing new insight into how microorganisms explore their environment. More broadly, this work shows how light can be used not only to study but also to control the collective behaviour of living systems.

All faculty members, PhD candidates, fellows, and students are invited to participate.
Chairperson: **Prof. Gianluca M. Farinola**, Department of Chemistry, University of Bari