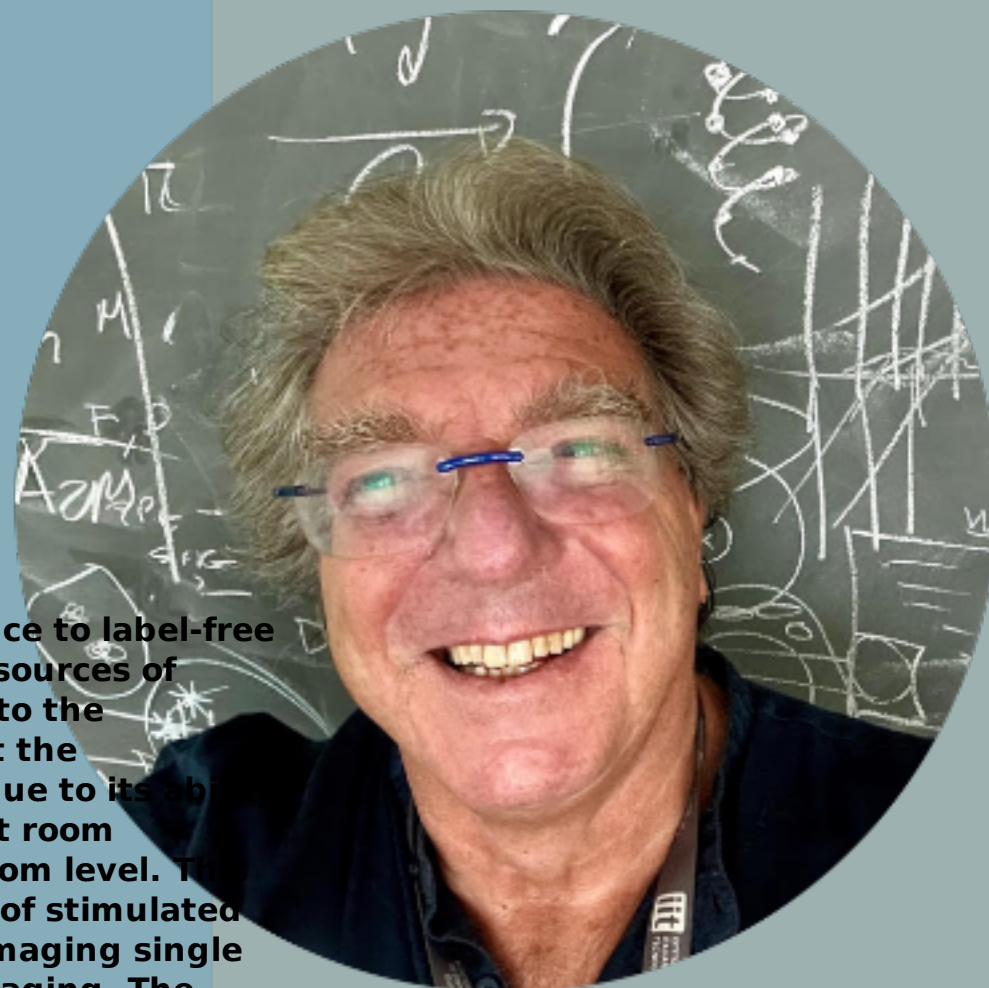


Science Colloquia

**Sala Conferenze, DFA
11/02/2025 h 14:45**



Modern optical microscopes, from super-resolved fluorescence to label-free contrast mechanisms, are powerful image-producing tools, sources of molecular information. This offers unprecedented insight into the morphological and functional properties of biological cells at the nanoscale. However, today optical microscopy goes atomic due to its ability to provide a localization accuracy of fluorescent molecules at room temperature and atmospheric pressure down to the Angstrom level. This ability was on the air since the beginning of the application of stimulated emission to microscopy (STED) and when the possibility of imaging single sparse molecules turned into single molecule localization imaging. The atomic optical microscope is the consequence of a pathway across several revolutions in optical microscopy. We will touch some of them from confocal to multiphoton microscopy, from the advent of the green fluorescent proteins to the photo-activatable ones, from lifetime imaging and selection to light-sheet microscopy. In such a scenario the optical microscope can become intelligent transforming low resolution images into atomic precision ones boosted by artificial intelligence with the idea in mind that “a microscope in the machine” could enable transforming label-free images into molecular content images without the need to label samples.

I Science Colloquia del DFA “Ettore Majorana”, sono appuntamenti con la scienza dedicati a Ricercatrici e Ricercatori, Studentesse e Studenti (della Laurea Magistrale in Physics, del terzo anno della Laurea Triennale in Fisica, e dei Dottorati al DFA) interessati a condividere argomenti ed esperienze di ricerca. I Science Colloquia, coordinati dai Proff. Giuseppe Falci e Livio Lamia, si tengono con cadenza mensile.

The atomic optical microscope

**Alberto Diaspro
UniGE & IIT**

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“ETTORE MAJORANA”

