DIPARTIMENTO DI SCIENZE DI BASE
E APPLICATE PER L' INGEGNERIA

SAPIENZA
UNIVERSITÀ DI ROMA

Aula Seminari (RM004) – SBAI Department
Via A. Scarpa 14

Friday, 31 March 2023
12.00

From free-electrons to bound electrons: attosecond science with X-ray free-electron lasers

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Abstract:
Attosecond vision and X-ray vision have been attributed to several superheroes and were achieved separately in real-life thanks to groundbreaking advances in laser technology and accelerator science. In my colloquium I will describe the quest to combine attosecond and X-ray vision using the most advanced X-ray sources in the world: X-ray free-electron lasers (XFELs).

Attosecond XFELs are the subject of an intense research effort worldwide that involves large X-ray facilities, advanced plasma-based particle accelerators and cutting-edge laser technology. Our attosecond science effort at SLAC has evolved from an accelerator R&D project to a new scientific program, producing observations of coherent electronic phenomena with atomic site specificity and unprecedented temporal resolution.

In my talk will introduce the physics of XFELs and their state of the art. I will then present our results on attosecond pulse generation and its application to the observation of coherent electron dynamics in molecules. Finally, I will discuss our ongoing research efforts towards plasma-based attosecond sources, capable of combining the peak power of XFELs with the fractional bandwidth of state of the art few-cycle lasers.

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Zoom Link: https://uniroma1.zoom.us/j/7356266604