

# **Attosecond pulse generation technology, its challenges and the role of ELI-ALPS**

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**Abstract:**

Observing fast phenomena in time resolved manner and control the outcome of such things were always in center of research. As technology developed, we improved from millisecond temporal resolution through micro, nano and picosecond resolution up to femtosecond by the '90s. Electron transitions within matter happens on even shorter time scale, on attoseconds. In 2023 the Nobel committee honored the founders of atto science with their prize, recognizing the importance of this research.

In this lecture we will guide the audience through the technology and the challenges behind generating attosecond pulses focusing on four different ways to generate such radiation: gas, bulk, solid high harmonic generation and XFELs. Furthermore, we give you an insight into ELI-ALPS, the facility that puts the investigation of ultrafast phenomena in forefront of its research.