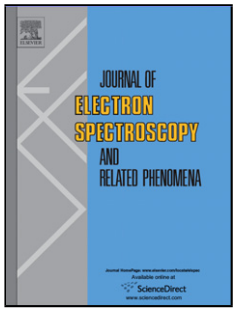

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Advances in high-order harmonic generation sources for time-resolved investigations

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Abstract

We review the main research directions ongoing in the development of extreme ultraviolet sources based on high-harmonic generation for the synthesization and application of trains and isolated attosecond pulses to time-resolved spectroscopy. A few experimental and theoretical works will be discussed in connection to well-established attosecond techniques. In this context, we present the unique possibilities offered for time-resolved investigations on the attosecond timescale by the new Extreme Light Infrastructure Attosecond Light Pulse Source, which is currently under construction.

Keywords: high-order harmonic generation; attosecond spectroscopy; ultrafast time-resolved dynamics

1. Introduction

Since the first demonstration of high-order harmonic generation (HHG) in gases [1, 2], the efforts of several research groups, combined with the development of new technologies for the generation of intense, high-repetition rate driving sources in the near (IR) and mid-infrared (mid-IR) spectral range, have led to impressive progress in the field of ultrafast extreme ultraviolet (XUV) spectroscopy and of attosecond science. After the first pioneering experiments

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