

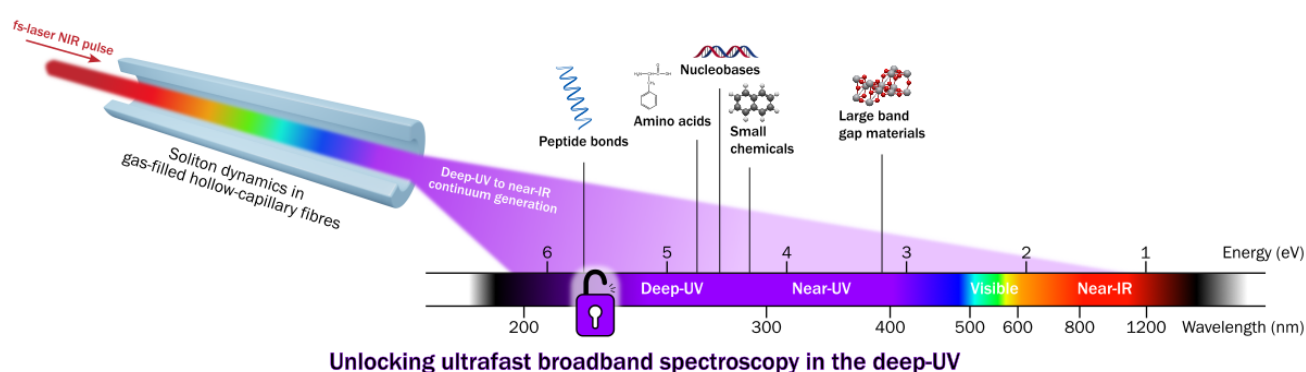
Mind the spectral gap: Extending ultrafast spectroscopy to the deep ultraviolet with stretched hollow-core fiber technology

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Ultrafast spectroscopy in the ultraviolet (UV) is an attractive tool to probe the dynamics of (bio)molecules via important UV-chromophores, such as peptide bonds, amino acids, nucleotides, and many organic ligands [1]. However, despite recent progress in photonic technology [2], the deep-UV region below 300 nm has remained largely unexplored, with only few reports of broadband ultrafast spectroscopy setups and studies in this spectral region [3].

To extend the spectral range of ultrafast spectroscopy, we now employ a novel source of intense, broadband deep-UV pulses: soliton dynamics in gas-filled hollow capillary fibers (HCFs) [4,5]. Here we present the implementation of an HCF-based transient absorption setup with ultra-broadband coverage (200-800 nm) that includes the entire deep-UV window (200-450 nm). We demonstrate the capabilities of our novel approach with benchmark experiments on well-studied Fe(II)-complexes that display ultrafast dynamics encoded in the deep-UV. The results highlight the unique potential of HCF technology to extend ultrafast molecular spectroscopy to the deep-UV and expand its scope to study (bio)molecular dynamics in solution.

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