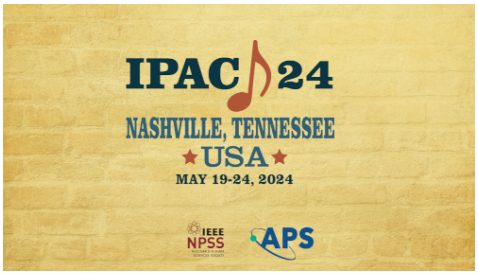

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Commissioning of spectral diagnostics and future concepts for the PAX experiment at FACET-II

Monday 20 May 2024 16:00 (2 hours)

The ongoing Plasma-driven Attosecond X-ray source experiment (PAX) at FACET-II aims to produce coherent soft X-ray pulses of attosecond duration using a Plasma Wakefield Accelerator [1]. These kinds of X-ray pulses can be used to study chemical processes where attosecond-scale electron motion is important. For this first stage of the experiment, PAX plans to demonstrate that <100 nm bunch length electron beams can be generated using the 10 GeV beam accelerated in the FACET-II linac and using the plasma cell to give it a percent-per-micron chirp. The strongly chirped beam is then compressed in a weak chicane to sub-100 nm length, producing CSR in the final chicane magnet at wavelengths as low as 10s of nm. In this contribution we describe the commissioning of the spectral diagnostics as well as the results expected of this experiment. Additionally, we describe a future iteration of the experiment in which short undulators are used to drive coherent harmonic generation to produce attosecond gigawatt X-ray pulses at 2 and 0.4 nm, with lengths comparable to the shortest attosecond pulses ever measured at 2 nm using HHG.

Footnotes

[1] C. Emma, X.Xu et al APL Photonics 6, 076107 (2021)

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