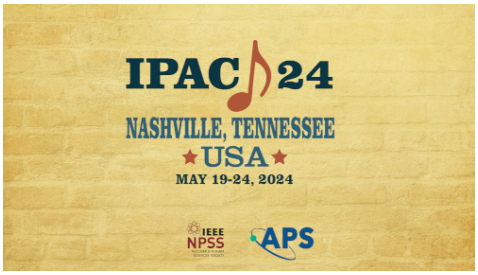

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Two-color FEL pulse generation at PAL-XFEL

Wednesday, 22 May 2024 09:30 (20 minutes)

PAL-XFEL has achieved successful operation with both SASE and self-seeding modes. In an effort to broaden the capabilities of PAL-XFEL, research has been conducted on the generation of two-color XFEL pulses, leading to the development of two additional modes: two-color XFEL with time delay and pulse duration control, and time-synchronized two-color XFEL. In the first mode, a dipole magnet at the self-seeding section and a slotted foil at the bunch compressor are utilized. The pump and probe XFEL pulses are generated from undulators before and after the self-seeding section, respectively. The time delay between the pulses can be controlled using the dipole magnet, and the pulse duration can be manipulated using the triangular slotted foil. For the second mode, phase shifters are employed. Typically, phase shifters are used to optimize FEL intensity by matching the phase between the FEL pulse and the electron beam. However, by adjusting the phase shifter setting away from the matched condition, sideband spectra can be introduced, resulting in the generation of time-synchronized two-color XFEL pulses. The experimental results of these two additional modes will be presented.

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