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Characterization and recent results of the LWFA driven COXINEL FEL

Thursday, 17 April 2025 17:40 (20 minutes)

This presentation summarizes recent progress made by the HZDR-Soleil collaboration on seeded free-electron-laser performance with the COXINEL line operated at HZDR's laser plasma electron accelerator.
Following the first demonstration of lasing [1], tuning range and output spectrum were studied [2], while a careful analysis of the shape of the interference pattern of seed and FEL light revealed novel insight into the FEL process.
Progress in the control of the LWFA stage in particular in increasing the spectral charge density to 10 pC/MeV (350 pC FWHM at ~200 MeV) recently enabled to boost FEL output to pulse energies of up to 50 nJ, close to expectations for the given undulator geometry, encouraging future scaling to shorter wavelength.
[1] M. Labat, et al., Nature Photonics 17, 150 (2023)
[1] M. Labat, et al., PRAB in press (2025)

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