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Progress on Experiments towards LWFA Based FELs

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Free Electron Lasers are commonly regarded as the potential key application of laser wakefield accelerators. It was noticed that electron bunches exiting from state-of-the-art laser wakefield accelerators exhibit a normalized 6-dimensional beam brightness comparable to those in conventional linear accelerators. Effectively harnessing this beneficial beam property for an LWFA-based FELs is challenging due to the extreme initial conditions particularly in terms of beam divergence and energy spread. Several different approaches for capturing, reshaping and matching LWFA beams to suited undulators are currently being explored, for instance bunch de-compression or transverse-gradient undulator schemes. In this talk these and further concepts will be discussed with a focus on recent experimental achievements.

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