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Femtosecond fibre laser beam combination

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The presentation will start with a brief review about the history and achievements of advanced rod-type rare earth doped fibers and their use in ultrafast fiber laser systems followed by an introduction to coherent addition of multiple individual emissions as a performance-scaling concept. To further enhance the performance towards multi-Joule pulse energy and towards Megawatt average power in an efficient and cost effective scheme we propose spatially and temporally separated amplification of chirped pulses. One representative of that approach is the DPA-CPA (DPA = divided pulse amplification, CPA = chirped pulse amplification) scheme, which allows for a significant reduction of amplification channels (i.e. number of fibers). We will present the concept, an envisaged architecture, the strengths and the challenges, manufacturing aspects as well as a budget estimation.

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