

Digital low level optical control for multidimensional coherent laser combining

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Recently, we have demonstrated new methods to actively stabilize multi-way laser coherence states in the dimensions of time, space and spectrum, so that we can effectively combine many laser beams into one in each dimension. This paper summarizes many of our technical approaches and milestones, from optical physics modeling, to FPGA based feedback control platform, to machine learning pattern recognitions and experimental demonstration results. This technique paved the way for building high power lasers that have many applications, such as driving the laser plasma Wakefield accelerator, manufacturing, defense and many more.

Keyword

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