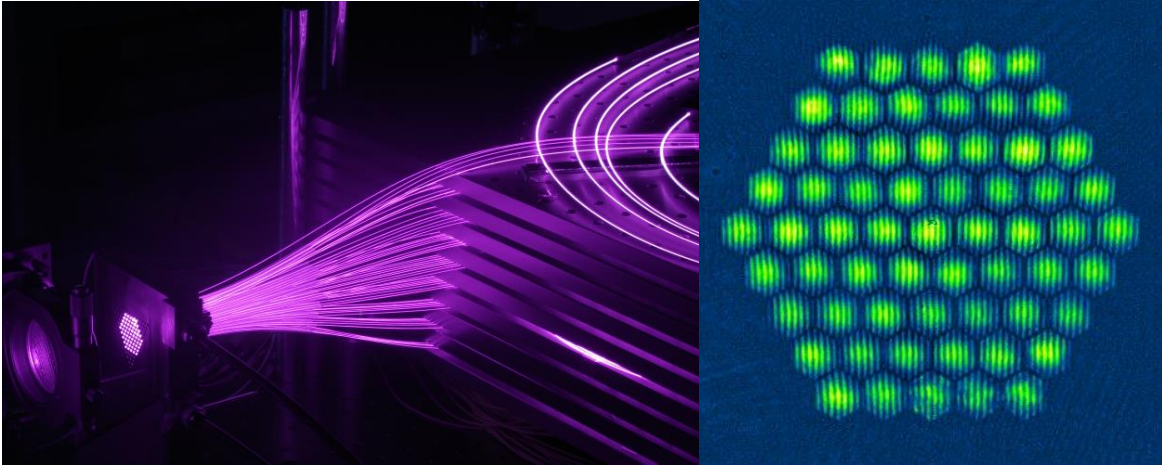


Title : Coherent Beam Combining femtosecond digital laser		
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Webpage : https://luli.ip-paris.fr/recherche/physique-des-lasers/xcan		
Research Area : Optics, Laser physics, Nonlinear optics		
Methods:		
PhD track subject :		
<p>Tailoring the distribution of light to specific experimental or industrial needs is a quest as old as optical engineering. However, it was not until the invention of the laser in 1960 that it was possible to start using coherent light for this purpose. The development of techniques for coherent combination of multiple laser beams opens the way to a paradigm shift in laser architecture where the manipulation of light is done upstream and no longer only downstream of the light source as such. Thus, the scientists are offered the possibility to shape the most relevant source for their applications; at LULI, we have built XCAN, the first and only (so far) CBC femtosecond fiber digital laser based on 61 tiled channels stacked in a hexagonal arrangement and operating in both high peak and average power regimes. XCAN is a digital laser prototype where amplitude, phase (and eventually polarization) can be adjusted at the scale of an elementary "pixel" (beam) to shape an arbitrary source electric field distribution for applications requiring power regimes (peak/average) up to GW/kW.</p>		
		
XCAN femtosecond, kW, 61 channels digital laser		
References :		
<p>I. Fsaifes, L. Daniault, S. Bellanger, M. Veinhard, J. Bourderionnet, C. Larat, E. Lallier, E. Durand, A. Brignon, and J.-C. Chanteloup, "Coherent beam combining of 61 femtosecond fiber amplifiers," <i>Optics Express</i> 28(14), 20152–20161 (2020). https://doi.org/10.1364/OE.394031</p>		
<p>M. Veinhard, S. Bellanger, L. Daniault, I. Fsaifes, J. Bourderionnet, C. Larat, E. Lallier, A. Brignon, and J.-C. Chanteloup, "Orbital angular momentum beams generation from 61 channels coherent beam combining femtosecond digital laser," <i>Optics Letters</i> 46(1), 25-28 (2021). https://doi.org/10.1364/OL.405975</p>		
<p>I. Fsaifes, C-A. Ranély-Vergé-Dépré, M. Veinhard, S. Bellanger & J.-C. Chanteloup, "Far field energy distribution control using a coherent beam combining femtosecond digital laser", <i>Optics Express</i>, 31(5), 8217-8225 (2023). https://doi.org/10.1364/OE.474607</p>		
<p>J.-C. Chanteloup et I. Fsaifes, "Le laser XCAN : Façonner la lumière en mode digital", <i>Photoniques</i>, No. 118, 2023. https://doi.org/10.1051/photon/202311835</p>		