## **Optimization of High-Power Laser Pulse Temporal Shape**

Tuesday 27 February 2024 15:10 (10 minutes)

We study the optimization of high-power laser pulse temporal shape to obtain the shortest possible pulse duration by employing a control feedback loop between a pulse shaper and pulse duration measurements instrument.

Performance of five optimization algorithms were explored - the Differential Evolution algorithm, the Nelder-Mead

algorithm, and three hybridization approaches of Differential Evolution (DE), Bayesian optimization (BO) and Nelder-

Mead (NM) algorithms. The hybrid algorithms perform the exploration with the DE or BO algorithm and the exploitation with the NM algorithm. Algorithms were tested on a semi-physical model of the actual laser based on

linear and nonlinear phase accumulation. We find that the hybridization of the algorithms yields better overall results.

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