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Adaptive Laser Architecture Development and INtegration (ALADIN) - Towards Inertial-Fusion Ready Beam Control

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Achieving inertial fusion energy (IFE) requires laser systems capable of delivering hundreds of high-power, high-repetition-rate beams with exceptional stability. The ALADIN project (Adaptive Laser Architecture for Dynamic INertial fusion) addresses this challenge by developing adaptive laser control technologies that enable reliable, repeatable fuel compression in direct-drive IFE schemes. ALADIN focuses on three key objectives: (1) the integration and automation of adaptive laser architectures (ALA) to coordinate thousands of active components across large facilities through an open-source control framework; (2) the advancement of real-time adaptive optics and beamline control to ensure stable laser performance at 10 Hz operation; and (3) the expansion of spatiotemporal pulse-shaping capabilities to optimize fuel compression. By combining hardware innovation, control software development, and real-time diagnostics, ALADIN aims to raise the technology readiness of ALA systems and establish a long-term European competence network in laser stabilization for IFE.

On this poster, we present the goals, the structure and the status quo of ALADIN.

Speed talk:

Normal speed talk selection

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