ID contributo: **225** Tipo: **Poster (student)**

Bayesian optimization of the LUX laser-plasma accelerator

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Laser-plasma accelerators (LPAs) are on the cusp of becoming instrumental in real-world scientific applications. Nevertheless, to be seriously considered as viable alternatives to traditional machines, LPAs must offer competitive quality and flexibility in their electron beam parameters, meeting the diverse requirements of potential applications.
While previous experiments have demonstrated LPAs' inherent capacity to meet these challenges, pinpointing the ideal machine configuration to cater to the specific demands of an application remains a complex task. This complexity is due to the necessity of optimizing a single or multiple objectives, which often conflict with one another.
Bayesian optimization emerges as a promising solution to this challenge. It provides an efficient framework for finely tuning machines to generate beams that are custom-designed for each targeted application.

We present results on optimizing plasma accelerators, demonstrating this both in the design stage using simulations and in real-time at the LUX experiment. The aim is to offer insights into how we can effectively tune the experiment to accommodate a range of applications.

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Classificazione della track: WG7: Beam diagnostics, instrumentation, Machine Learning