

Contribution ID: 74

Type: Invited talk

Beamline-conscious Bayesian optimization for synchrotron facilities

Thursday 29 August 2024 16:35 (20 minutes)

Autonomous methods to align beamlines can decrease the amount of time spent on diagnostics, and also uncover better global optima leading to better beam quality. Bayesian optimization is a machine learningbased algorithm well-suited for high-dimensional, expensive-to-sample, and potentially noisy optimization problems, and it has been successfully implemented to autonomously align beamlines at several synchrotron facilities. However, there are beamline-specific obstacles that can hinder the robustness and efficiency of these efforts, meaning that most are tailored to a narrow context of optimization problems. In this talk, I outline these obstacles and their solutions, and show that it is possible to construct an adaptable, generalized framework for autonomous alignment that performs well at many different kinds of beamlines across different facilities. I present blop, a python package based on (but not exclusive to) the Bluesky framework for experiment orchestration. I outline its application to different optimization problems at several light sources (ALS, APS, NSLS-II, LCLS). I discuss the prospect of a unified, collaborative approach to beamline automation.

I plan to submit also conference proceedings

Yes

Primary author: MORRIS, Thomas (Brookhaven National Laboratory)

Co-authors: WOJDYLA, Antoine (Lawrence Berkeley National Laboratory); RAKITIN, Maksim (NSLS-II, Brookhaven National Laboratory, Upton, NY 11973, USA)

Presenter: MORRIS, Thomas (Brookhaven National Laboratory)

Session Classification: Mikrosymposium 3/2: Data, Automation and the Use of AI

Track Classification: 3. Data, Automation and the Use of AI