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Optimizing collimator positions using bayesian optimization in the Fermilab MI-8 transfer line

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Collimators are used to minimize losses and to remove particles that would otherwise get lost downstream and irradiate the machine. Finding the optimal jaw positions is time consuming and with the upstream beam properties changing, the collimation settings would need to be readjusted each time. Therefore, a method to optimize collimator positions and to operate them at full capacity in a short time is required for loss control downstream. A study of collimator positions was conducted and a machine learning (ML) model was developed to predict optimal collimator positions. Bayesian Optimization (BO) was used to calculate new jaw positions from the ML model. The results of BO and usage of ML for better performance of the collimation system are presented in this paper.

Footnotes

Paper preparation format

LaTeX

Region represented

America

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