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Free Electron Laser online optimization method based on deep reinforcement learning

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The lateral position deviation between the electron beam and undulators will lead to an interaction area decrease in practical high-gain free electron laser (FEL) equipment. Corrector magnets can be modified in the FEL control system to regulate the electron beam trajectory and promote laser power. Tuning tasks are time-varying, drifting, and multi-dimensional, and manual tuning by operators takes lots of time and effort. This paper proposes an online optimization algorithm using a twin delayed deep deterministic policy gradient (TD3) to automatically optimize laser energy under ever-changing conditions.

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Footnotes

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Yes

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