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A universal numerical optimization framework for studying seeded free-electron laser schemes

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Seeded free-electron lasers (FELs) have become indispensable tools across numerous scientific fields, owing to their high coherence and stability. To facilitate the discovery and optimization of such FELs, we propose a general-purpose framework utilizing intelligent optimization algorithms for identifying high-performance seeded FELs. In this paper, we demonstrate that our framework can automatically reproduce established seeded FELs, eliminating the need for prior physical analysis. Furthermore, this framework has the potential to discover novel schemes through the systematic incorporation of additional physical elements.

Footnotes

Funding Agency

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Yes

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