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The SPARTA project: toward a demonstrator facility for multistage plasma acceleration

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Plasma acceleration is a rapidly maturing technology, but is not yet ready for large-scale applications such as linear colliders. The SPARTA project aims to develop a near-term, medium-scale plasma-accelerator facility to enable new experiments in strong-field quantum electrodynamics (SFQED)—an application that requires solving two of the most important remaining challenges in plasma acceleration: reaching high energy by using multiple accelerating stages; and achieving high beam stability. We report on progress toward the three main objectives: demonstrating a nonlinear plasma lens for achromatic beam transport between stages; developing self-stabilization and instability suppression mechanisms; and developing a conceptual design for a multistage SFQED facility.

Footnotes

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