

Abstract Submitted
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Strong field physics enabled by a 100 PW laser LIANGLIANG JI,
Shanghai Institute of Optics and Fine Mechanics — A 100 PW laser can support focal intensities beyond $10^{23}\text{W}/\text{cm}^2$, which will drive the interaction into the strong relativistic regime and create QED-featured plasma. In the former, charged particles can be accelerated to the unprecedented GeV to tens-of-GeV level via laser-driven wakefield acceleration. The concept of laser-driven table-top accelerators can be significantly advanced. Further, interaction in the near-QED regime will exhibit exotic new effects such as gamma photons emission, radiation-reaction effect and QED cascade. A most exciting prospect is combining a 100 PW laser with a hard X-ray free-electron laser (XFEL) facility. It will lead the chasing on the discovering vacuum birefringence—a prominent strong field QED effect of vacuum. The proposed scientific activities and experimental design are introduced for a 100 PW laser system.

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