

Abstract Submitted
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Plasma-induced frequency upshifts in beam-driven QED cascades¹ KENAN QU, Princeton University, SEBASTIAN MEUREN, Stanford University, NATHANIEL FISCH, Princeton University — QED cascades can generate electron-positron pairs when the electric field or magnetic field substantially exceeds the Schwinger limit. Signatures of collective pair plasma effects in these QED cascades are shown to appear in exquisite detail through, e.g., plasma-induced frequency upshifts in the laser spectrum. Remarkably, these signatures can be detected even in small plasma volumes moving at relativistic speeds. Strong-field quantum and collective pair plasma effects can thus be explored with existing technology, provided that ultra-dense electron beams were co-located with multi-PW lasers. 1. K. Qu, S. Meuren, and N. J. Fisch, arXiv:2001.02590 (2020)

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