

Abstract Submitted  
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**Strong surface magnetic field generation by relativistic short pulse laser irradiation of opaque magnetized targets**<sup>1</sup> KATHLEEN WEICHMAN, University of California, San Diego, ALEXANDER ROBINSON, STFC Rutherford Appleton Laboratory, UK, MASAKATSU MURAKAMI, ILE, Osaka University, ALEXEY AREFIEV, University of California, San Diego — We demonstrate that the irradiation of a thin opaque target with an embedded seed magnetic field by a relativistically intense laser pulse can trigger the generation of an order-of-magnitude stronger magnetic field with opposite sign at the rear target surface. This magnetic field generation is a kinetic effect associated with the cyclotron rotation of laser-heated electrons transiting through the target and the compensating current of cold electrons. We present a simple predictive scaling for this phenomenon and conduct 1D and 2D particle-in-cell simulations to confirm its applicability over a wide range of conditions. For kilotesla-level seed fields, the strong seed and surface-generated magnetic fields can have a pronounced impact on application-relevant plasma dynamics, including ion acceleration from  $\mu\text{m}$ -thick targets.

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Kathleen Weichman  
University of California, San Diego

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