Abstract Submitted
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High Power Picosecond Laser Pulse Recirculation for Compton Scattering[1] M. SHVERDIN, S. ANDERSON, C. BROWN, S. BETTS, D. GIBSON, J. HERNANDEZ, M. JOHNSON, I. JOVANOVIC, D. MCNABB, M. MESSERLY, J. PRUET, A. TREMAINE, F. HARTEMANN, C. SIDERS, C.P.J. BARTY, LAWRENCE LIVERMORE NATIONAL LAB TEAM — Gamma-ray generation by Compton back-scattering laser photons off a relativistic electron beam suffers from a small Thomson cross-section. Recirculating unused laser photons can increase the average gamma-ray flux. Traditional approaches to laser recirculation rely on either resonant coupling of a low-energy pulse train to a cavity or active pulse switching using a pockels cell. Our alternative, passive approach does not require interferometeric alignment accuracy and is compatible with ultrashort, high peak power pulses. Pulse injection is achieved by a thin frequency converter inside the cavity in the path of the incident beam. The cavity consists of dichroic mirrors that transmit the incident but reflect the frequency-converted light. Initial modeling and experiments predict better than 20 times increase in the average brightness of Compton back-scattering sources with our pulse recirculation method.

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