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Multiple colliding laser pulses for high intensity particle physics studies.[1] STEPAN BULANOV, LBNL, USA, J. MAGNESSON, Chalmers University of Technology, Sweden, A. GONOSKOV, M. MARKLUND, University of Gothenburg, Sweden, T. ZH. ESIRKEPOV, J. K. KOGA, K. KONDA, K. KANDO, KPSI, National Institutes for Quantum and Radiological Science and Technology, Japan, S. V. BULANOV, P. V. SASOROV, G. KORN, Institute of Physics ASCR, ELI-Beamlines Project, Czech Republic, C. G. R. GEDDES, C. B. SCHROEDER, E. ESAREY, LBNL, USA — Apart from maximizing the strength of optical electromagnetic fields achievable at high-intensity laser facilities, the collision of several phase-matched laser pulses has been identified theoretically as a trigger of and way to study various phenomena. These range from the basic processes of strong-field quantum electrodynamics to Cherenkov radiation, emitted by an ultrarelativistic electron in a vacuum due to an induced strong electromagnetic field refraction index larger than unity. We report here on a systematic analysis of different regimes and opportunities, including a synergetic Cherenkov-Compton process, achievable with the concept of multiple colliding laser pulses, for both current and upcoming laser facilities.

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