

Abstract Submitted
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Simulations On Pair Creation In Collision Of γ -Beams Produced With High Intensity Lasers OLIVER JANSEN, Institute for Fusion Sciences, University of Texas in Austin, XAVIER RIBEYRE, EMMANUEL D'HUMIERES, SOPHIE JAQUIER, VLADIMIR TIKHONCHUK, Univ. Bordeaux/CNRS/CEA, Centre Lasers Intenses et Applications — Direct production of electron-positron pairs in two photon collisions, the Breit-Wheeler process, is one of the most basic processes in the universe[1]. However, this process has never been directly observed in the laboratory due to the lack of high intensity γ sources[2]. For a feasibility study and for the optimisation of experimental set-ups[3] we developed a high-performance tree-code. Different possible set-ups with MeV photon sources were discussed and compared using collision detection for huge number of particles in a quantum-electrodynamic regime. For this we implemented bounding volume hierarchies in a tree-like code structure. We applied this code on the question whether the Texas Petawatt laser[5] could produce a significant number of pairs within the framework of the NSF project National Science Foundation under Grant No. 1632777.

References: [1] Ruffini, R. *et al.* Physics Reports **487**, 1-140 (2010). [2] Bamber C. *et al.* Phys. Rev. D, **60**, 092004 (1999). [3] X. Ribeyre *et al.*, Phys. Rev. E **93**, 013201 (2016). [4] C. Ericson, Real Time Collision Detection, CRC Press, New York, (2005). [5] Gaul *et al.*, Tech. Digest (Opti. Soc. of America, 2005), **JFB2**.

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