Modeling of generation, capture, and acceleration of positron beams at BELLA[1] LIGIA DIANA AMORIM, STEPAN S. BULANOV, CARLO BENEDETTI, CARL B. SCHROEDER, AXEL HUEBL, MAXENCE THEVENET, REMI LEHE, CAMERON G. R. GEDDES, ERIC ESAREY, JEAN-LUC VAY, Lawrence Berkeley National Laboratory — Future, compact high-energy (TeV-class) colliders will require the production and acceleration of high-quality positron beams. We explored the possibility of using a 10 GeV-class electron beam from a laser-driven plasma accelerator, such as the ones under development at the BELLA Center of LBNL, to produce a positron beam. This can be achieved by capturing the particles generated during the pair decay of Bremsstrahlung radiation that is created when the relativistic electron beam travels through a high-Z solid target. We model the production of positron beams with the Monte Carlo based Geant4 library, and their capture and acceleration in plasmas using the WarpX particle-in-cell code. In this talk we will discuss scenarios relevant to future experiments at the BELLA Center.

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Date submitted: 27 Jun 2020   Electronic form version 1.4