Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

**Enhanced gamma-ray emission in structured targets irradiated by counter-propagating laser pulses**[1] YUTONG HE, UCSD, ZHENG GONG, UT, TOMA TONCIAN, HZDR, ALEXEY AREFIEV, UCSD — Previous research has shown that a structured over-dense target irradiated by a high-intensity laser pulse ($I \approx 5 \times 10^{22}\mathrm{W/cm}^2$) is an efficient source for collimated beams of multi-MeV gamma-rays [Stark et al. PRL 116, 185003 (2016)]. The newly-constructed laser facilities, such as ELI Beamlines, will enable experiments with multiple laser pulses instead of just one. Motivated by this experimental capability, we consider a setup where a structured target with an embedded relativistically transparent channel is irradiated by two counter-propagating laser pulses. Using 2D particle-in-cell simulations, we show that the laser energy conversion rate into multi-MeV photons is significantly increased due to head-on collision between laser-accelerated electrons and a counter-propagating laser. The main advantage of the setup is that the target channel provides automatic alignment between the electrons and the beam.

[1]This works was supported by AFOSR (FA9550-17-1-0382). The code EPOCH was in part funded by the UK EPSRC grants EP/G054950/1, EP/G056803/1, EP/G055165/1 and EP/ M022463/1.

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Date submitted: 02 Jul 2019 Electronic form version 1.4