Relativisitic Flying Mirror in the Ultra-high Intensity Regime

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There is the need for high brillance γ-ray sources for fundamental physics applications. Relativistic flying mirrors generated by ultra-high intensity laser pulses (driver) propagating in plasma have been used to upshift and focus counter-propagating laser pulses (source) via the double Doppler effect (see [1] and cited references). Up to now the source laser pulse has been of sufficiently low intensity so as to not significantly perturb the mirror. We have shown in particle-in-cell (PIC) simulations that in the case where the source pulse is of high intensity the boosted harmonics can be generated[2]. In this paper we investigate this using 2D and 3D PIC simulations where two counter-propagating laser pulses of high intensity, one focusing and one de-focusing, collide. We will present our considerations for using relativistic flying mirrors towards achieving high flux γ-ray sources.

References

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