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ERRATUM

Optimum laser parameters for 1D radiation pressure acceleration—ERRATUM

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1. CORRECTIONS TO SECTION 4

The version of this manuscript originally published contained a sign error that appears at the re-transformation of the equations into laboratory frame in Section 4. The correctly re-transformed Eq. (8) reads:

$$\omega^2 = k^2c^2 + \frac{1 + u_e^1/c}{1 - u_e^1/c}\omega_{pe}^2 \tag{8}$$

and subsequently Eq. (9) is:

$$k = \pm\frac{\omega}{c}\sqrt{1 - \frac{1 + u_e^1/c}{1 - u_e^1/c}\frac{\omega_{pe}^2}{\omega^2}}. \tag{9}$$

The sign error in the original letter also led to a misinterpretation: The Doppler-shifting does not limit the maximum velocity, achieved by the RPA, but it has impact on the admissible lower target thickness. Re-arranging the corrected Eq. (11) for d_0 yields:

$$\begin{aligned} d_0 &\gg \frac{c\varkappa_e}{\omega}\left(\frac{1 + u_e^1/c}{1 - u_e^1/c}\frac{\varkappa_e\omega_{pe,0}^2}{\omega^2} - 1\right)^{-1/2} \\ &\approx \frac{c\sqrt{\varkappa_e}}{\omega_{pe,0}}\sqrt{\frac{1 - u_e^1/c}{1 + u_e^1/c}}, \end{aligned} \tag{11}$$

where the last term holds true for $\omega_{pe,0} \gg \omega$. Therefore, Eqs (12) and (13) in the original manuscript are obsolete, such as Figure 3. The correct interpretation is given in Figures 1 and 2: Figure 1 shows the lower limit for the initial target width

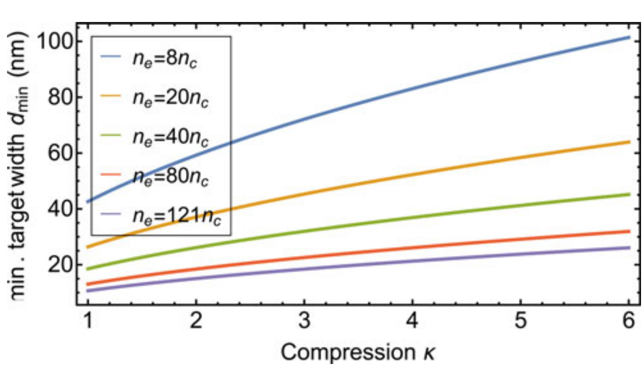

Fig. 1. Minimum admissible target width from Eq. (3) as a function of the compression $\varkappa_e$, for different initial densities with $\beta = 0.3$.

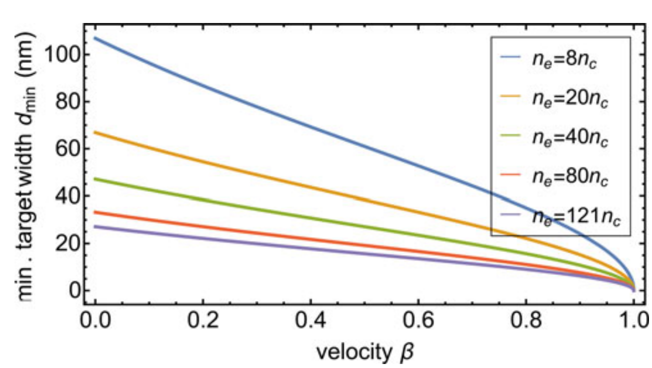

Fig. 2. Minimum admissible target width from Eq. (3) as a function of the longitudinal velocity $\beta = u_e^1/c$, for different initial densities with $\varkappa_e = 3.5$.

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as a function of the compression achieved at the RPA: The target thickness scales with $d \propto \varkappa_e^{-1}$, whereas the penetration depth scales with $\delta \propto \varkappa_e^{-1/2}$ and it is: $d/\delta \propto \varkappa_e^{-1/2}$.

This effect is countered by the Doppler-shifting, as depicted in Figure 2: With increasing velocity, the laser frequency decreases due to the Doppler-shifting and the limit for the target width decreases. At the RPA, both effects compete and for $\beta \ll 1$, the lower target width is $d_0 \approx (1+\beta)\varkappa_e^{-1/2}$.

Here, the average longitudinal velocity $\beta = u_e^1/c$ can be calculated from the prevalent model of a flying mirror (see, e.g. Macchi *et al.*, 2009), whereas the evaluation of the compression $\varkappa_e$ requires a more extensive model (see, e.g. Schmidt & Boine-Frankenheim, 2016).

REFERENCE

Schmidt, P., Boine-Frankenheim, O. & Mulser, P. (2015). Optimal laser parameters for 1D radiation pressure acceleration. *Laser Part. Beams* **33**, 387–396.

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