Erratum: Optical klystron enhancement to self-amplified spontaneous emission free electron lasers [Phys. Rev. Accel. Beams 9, 070702 (2006)]

Yuantao Ding, Paul Emma, Zhirong Huang, and Vinit Kumar

(Received 18 October 2019; published 6 January 2020)

DOI: 10.1103/PhysRevAccelBeams.23.019901

The analytical Eqs. (5) and (6) for the optical klystron power gain of a self-amplified spontaneous emission free-electron laser contained some errors. The corrected formula for Eq. (5) is

$$G \approx \frac{1}{9}\left\{1 + (4 + D^2)\exp(-D^2{\sigma_\xi}^2) + 2\sqrt{3}D\exp\left(-\frac{D^2{\sigma_\xi}^2}{2}\right) + \left[(4 + \sqrt{3}D)\exp\left(\frac{-D^2{\sigma_\xi}^2}{2}\right)\cos\left(\frac{D}{2\rho}\right) - D\exp\left(\frac{-D^2{\sigma_\xi}^2}{2}\right)\sin\left(\frac{D}{2\rho}\right)\right]\exp\left(\frac{-D^2{\sigma_\nu}^2}{8\rho^2}\right)\right\},$$

where $D = k_r R_{56}\rho$. To compare the changes on the results, we chose the $\sigma_\delta = 0.1\rho$ case and replotted the power gain factor G versus the chicane strength R_{56} as we showed in the Fig. 1 of the original paper. We plot here the two curves using the corrected formula and the old formula, respectively. We can see that these corrections lead to a slightly smaller gain when $k_r R_{56}\sigma_\delta \geq 1$.

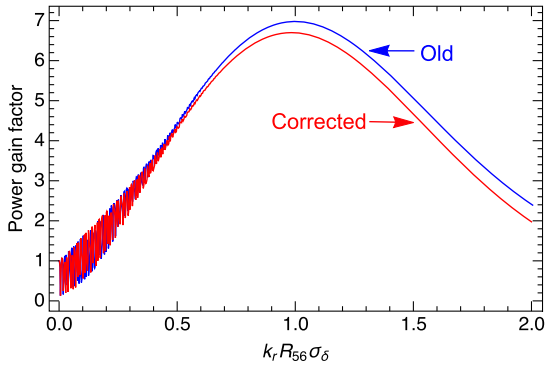

FIG. 1. 1D power gain factor with relative energy spread $\sigma_\delta = 0.1\rho$. Red line shows the gain with the corrected formula, while the blue line used the old formula.

In a similar fashion, the corrected formula for Eq. (6) is

$$G \approx \frac{1}{9}\left[1 + (4 + D^2)\exp(-D^2{\sigma_\xi}^2) + 2\sqrt{3}D\exp\left(-\frac{D^2{\sigma_\xi}^2}{2}\right)\right].$$

The results from the corrections on Eq. (6) are also negligible. Conclusions were not affected by this error.

We thank G. Penco (Sincrotrone Trieste) and E. Schneidmiller (DESY) for pointing out these errors.

Published by the American Physical Society under the terms of the Creative Commons Attribution 4.0 International license. Further distribution of this work must maintain attribution to the author(s) and the published articles title, journal citation, and DOI.