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# Coherent undulator radiation with account of the beam energy spread

*Monday 2 June 2025 16:00 (2 hours)*

When a microbunched beam is sent to a resonantly tuned undulator it radiates coherent radiation with the intensity propotional to the bunching squared of the beam. According to *, the radiated energy increases with the undulator length. This conclusion, however, is only valid if one ignores the energy spread of the beam (and also the beam angular spread). The finite energy spread smears the microbunching, ultimately suppressing coherent radiation beyond a certain distance. In this work, we calculate the radiation of a microbunced beam with an energy spread and find the maximum energy that it can radiate coherently.

## Footnotes

- E. Saldin, E. Schneidmiller, and M. Yurkov. NIMA, vol. 539, no. 3, pp. 499–526, 2005.

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