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## Lifetime without Compromise

*Sunday, 7 May 2023 16:00 (2 hours)*

Diffraction-limited light sources have garnered significant interest – yet the smaller equilibrium size of their electron bunches also reduces the beam-lifetime. One remedy is to vertically excite the electron beam, for instance using a Multi Bunch Feedback (MBF) system. Previous work has demonstrated that this approach can safely increase the vertical emittance, thus beam-lifetime. However, not all operational vertical emittances are created equal. Driving the beam at frequencies near resonances can generate large coherent beam-centroid motion that results in an enlarged apparent photon-source. In this work, we present a methodology, justified with theoretical reasoning and simulation, that finds the optimal combination of frequency and kick strength that satisfies both the operational requirements and the beamline interests. The methodology is then demonstrated for the Diamond-II lattice, including short-range wake effects.

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### Footnotes

\*S. Preston et al 2022, IBIC22

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Yes

**Primary author:** WILKES, Seb (University of Oxford)

**Presenter:** WILKES, Seb (University of Oxford)

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