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Accurate control of seed and free-electron laser chirp with bunching spectral analysis

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The spectro-temporal characteristics of free-electron laser (FEL) radiation emerging from external seeding schemes such as high-gain harmonic generation are shaped by the properties of the initial seed laser. Accurate control of the seed laser envelope and phase is essential to allow for precise manipulation of the FEL output. Based on experimental data obtained at the seeded FEL user facility FERMI, it is shown that detailed bunching spectral analysis enables monitoring of the seed and FEL frequency chirp. The bunching model is extended to be capable of also reproducing the FEL power.

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Footnotes

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Yes

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