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Proposal for a New Approach to Undulator Tuning

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In the PolFEL team, we are working on developing a new, more precise method of undulator tuning. Our method is based on an accurate model of the undulator's magnetic field distribution, described using approximation-free analytical expressions derived directly from the Biot-Savart equation. Having an accurate description of the magnetic field allows tuning to be carried out in two phases: (1) minimizing the vertical drift of the electron beam by optimizing the order of magnets, (2) vertical positioning of the magnets to ensure the uniformity of the magnetic field better than 0.1%, which is crucial for the efficient emission of the laser beam.

Footnotes

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