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## Working Principles of High-Gain Free-Electron Lasers

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Free-electron Lasers are radiation sources, based on the interaction of an relativistic electron beam with its radiation field within an undulator. The process of a collective instability causes the coherent emission at a freely tunable wavelength. As radiation devices FELs surpasses 3rd generation sources in terms of peak brilliance and opens up new classes of experiments such as e.g. lenseless imaging of molecules and atom clusters. This presentation gives a brief introduction into the physics of FELs and the performance as a radiation source.

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