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【6】 An adventure along Free Electron Laser development

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Free electron lasers (FEL) are tuneable powerful lasers ranging from the infrared to the X-ray, serving for the exploration of matter. They use a simple and elegant gain medium, where coherent radiation is generated using free electrons in a periodic permanent magnetic field generated by a so-called undulator. The light–electron interaction in the undulator leads to a bunching process, setting in phase the electron emitters. Starting from the FEL origins, first FEL oscillators results and user applications to the advent of unique intense tuneable X-ray linear accelerator FEL, the progress of the field will be reported. New directions open by the laser plasma acceleration will be discussed.

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