Synchrotron Radiation Representation in Phase Space

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We are working on a way to compute distributions of photons in phase space from first principles as synchrotron radiation is emitted by relativistic electron bunches passing through a magnetic array known as undulator. The goal would be to produce a practical tool that will allow inclusion of realistic effects affecting the motion of electrons inside the undulator – spread to electron beam, steering errors, and focusing – in how they affect the density of photons in the phase space at the exit of the device. This distribution function of photons in phase space is the same as generalized brightness – the main figure of merit of synchrotron radiation.

Suitable only for students with exceptional analytical and programming skills.