

Electromagnetic Radiation of Electrons in Periodic Structures

Bearbeitet von
Alexander Potylitsyn

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Preface

In the existing literature there are a number of monographs, with sufficient completeness describing such traditional radiation mechanisms, as undulator radiation, bremsstrahlung, coherent bremsstrahlung, transition radiation. However, the interest has appreciably increased in recent years to such effects, as parametric X-ray radiation, Smith-Purcell radiation, Compton-effect on the relativistic electrons (which can be treated as radiation in a “light” undulator).

These new mechanisms of radiation, as well as some others (for example, the resonant transition radiation) have the common characteristic i.e. the radiation is quasimonochromatic one because of the constructive interference of radiation fields from each element of periodic structure.

An attempt to assemble the results of the numerous theoretical and experimental works devoted to investigation of radiation, which is generated by relativistic electrons in different periodic structures with the period from $\sim 10^{-8}$ cm (the crystals) up to ~ 1 cm (undulators) is made in this book. Author tried to present the book contents in the form being available for researchers planning the usage of radiation beams for applied purposes, as well as for beginning scientists. So, the list of quoted literature does not claim to be exhaustive.

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