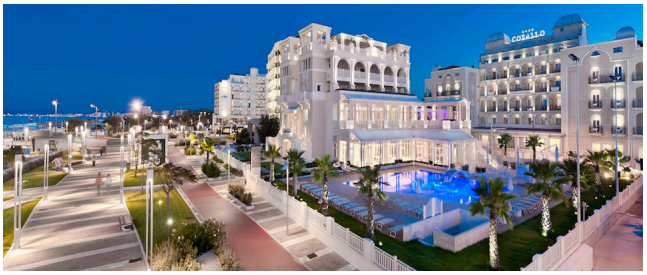

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Coherent channeling radiation of electron beam in optical lattice

Monday, 5 June 2023 18:13 (1 minute)

The interaction of particles in the channeling regime with crystal lattices has a number of features that allow controlling charged particle beams [Edouard N. Tsyganov, “Some aspects of the mechanism of a charge particle penetration through a monocrystal.”, FERMILAB preprint, 1976.], as well as obtaining high-energy electromagnetic radiation [M.A. Kumakhov, “On the theory of electromagnetic radiation of charged particles in a crystal.”, Physics Letters A, 57(1):17 –18, 1976.]. The principles of particles beams control have found their application in practice (project UA9), but the creation of powerful radiation sources is not so promising due to the destruction of crystals during the passage of intense beams of charged particles. Optical lattices are devoid of such a disadvantage. Moreover, the larger size of the channels of the optical lattice will allow use of larger electron beams. And here the coherent part of the spectrum plays an important role. In this work the spectral-angular distribution of electron beam coherent radiation is found, taking into account the dependence of the electron channeled oscillations frequency on the oscillation amplitude.

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