

Lorentz-invariant diagram for strong field effects at high energies in oriented crystals and laser fields

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We demonstrate that electromagnetic strong field effects at high energies in oriented crystals (OC) [1] and in the field of powerful lasers [2] can be described by the same formulars depending on two Lorentz-invariant parameters. The corresponding calculations of the radiation spectra are presented. The crucial difference between lasers and crystals is that in the former case both invariants are independent, while in the crystal they are linearly related to each other [3]. This leads to a strong limitation on the range of possible values of these invariants in OC.

[1] Uggerhøj U I 2005 *Rev. Mod. Phys.* **77** 1131

[2] Popruzhenko S V and Fedotov A M 2023 *Physics – Uspekhi* **66** 460 – 493

[3] Khokonov M K 2023 *Physics Letters B* **846** 138208