Contribution ID: **132** Type: **Oral presentation**

Ratio of the contributions real and virtual photons diffraction in thin perfect crystals.

Tuesday, 27 September 2016 15:30 (15 minutes)

Yu. A. Goponov, S.A. Laktionova, M.A. Sidnin, I.E. Vnukov,

Belgorod National Research University, 14 Studencheskaya str., 308007 Belgorod, Russia

To evaluate the previously proposed method of calculating diffracted photon yields in thin perfect crystals [1], a comparison between calculated and experimental results [2-6] in the wide energy range of electrons and photons and the two implementing mechanisms of real photons emission generation: predominant contribution of the diffracted bremsstrahlung - experiments [2,3] and diffracted transition radiation –[4-6] was carried out. It is shown that the calculations according to the methodic [1] taking into account the experimental conditions describes the measurement results for thin crystals a rather well. Contribution of real photon diffraction is about 10-30% in the dependence from the crystal thickness. Experimental results for multi-crystal target in the experiment [6] where reported a significant excess of radiation yield in comparison with the calculation, taking into account the contribution of the diffraction of resonant transition radiation only, is analyzed. It is shown that the method [1] can't explain the experiment result too. Possible contribution of both emission mechanisms: diffracted resonance transition radiation [6] and diffracted transition radiation [1] for the condition of the experiment [6] is discussed. The work is supported by the Ministry of Education and Science of the Russian Federation (the State assignment N 3.500.2014/K).

References

1. S.A. Laktionova, O.O. Pligina, M.A. Sidnin, I.E. Vnukov // J. Phys. Conf. Ser. 517 (2014) 012020
2. D.I. Adeishvili et al. // DAN USSR, 1988, 298, P. 844. (in Russian)
3. A.V. Shchagin, V.I. Pristupa and N.A. Khizhnyak // NIM, 1995, B 99 P.277.
4. K.-H Brenzinger et al. //Z. Phys., 1997, A 358, P.107.
5. J. Freudenberger et al. // Phys. Rev. Let., 2000, 84, P.270
6. M.Yu. Andreyashkin et al. // JETP Lett., 1997, 65, P. 625

Summary

To evaluate the previously proposed method of calculating diffracted photon yields in thin perfect crystals [1], a comparison between calculated and experimental results [2-6] in the wide energy range of electrons and photons and the two implementing mechanisms of real photons emission generation: predominant contribution of the diffracted bremsstrahlung - experiments [2,3] and diffracted transition radiation –[4-6] was carried out. It is shown that the calculations according to the methodic [1] taking into account the experimental conditions describes the measurement results for thin crystals a rather well. Contribution of real photon diffraction is about 10-30% in the dependence from the crystal thickness. Experimental results for multi-crystal target in the experiment [6] where reported a significant excess of radiation yield in comparison with the calculation, taking into account the contribution of the diffraction of resonant transition radiation only, is analyzed. It is shown that the method [1] can't explain the experiment result too. Possible contribution of both emission

mechanisms: diffracted resonance transition radiation [6] and diffracted transition radiation [1] for the condition of the experiment [6] is discussed. The work is supported by the Ministry of Education and Science of the Russian Federation (the State assignment N 3.500.2014/K).

Primary author: Prof. VNUKOV, Igor (Belgorod sate university, Belgorod, Russia)

Co-authors: Mr SIDNIN, Mikhail (NRI BelSU); Mrs LAKTIONOVA, Svetlana (NRI BelSU); Mr GOPONOV, Yurii (NRI BelSU)

Presenter: Prof. VNUKOV, Igor (Belgorod sate university, Belgorod, Russia)

Session Classification: S1.3: Channeling & Radiations in Crystals