The Probability of Radiation of Twisted Photons in Dispersing Media

O. V. Bogdanov[a,b], *P. O. Kazinski*[a], <u>*G. Yu. Lazarenko*</u>[a,1]

[b] *Tomsk State University, Tomsk, Russia*
[b] *Tomsk Polytechnic University, Tomsk, Russia*

Transition and Vavilov-Cherenkov radiations of plane-wave photons are well studied and find many applications [1,2]. Modern research in this area are aimed at exploring new ef-fects arising from the orbital angular momentum (OAM) of particles [3,4]. One of the possible applications of these studies is to improve the Vavilov-Cherenkov detectors [4]. Furthermore, these types of radiation are employed to produce twisted photons [5]. The use of helical beams allows one to increase the OAM of generated photons [6].

We have developed a general theory of radiation of twisted photons by classical currents in an inhomogeneous dispersive medium. We applied the developed general theory to descrip-tion of radiation of twisted photons produced by a bunch of charged particles passing through a dielectric plate or an ideal conductor plate. The created photons in these cases have a non-zero orbital momentum.

References

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[1] Corresponding author: laz@phys.tsu.ru