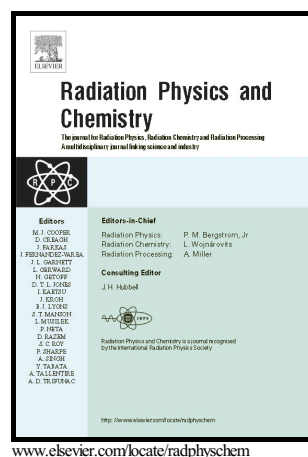


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Tatiana Yu. Alekhina, Andrey V. Tyukhtin



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*Corresponding author

Email address: tanya_alekhina@mail.ru, t.alekhina@spbu.ru (Tatiana Yu. Alekhina)

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Tatiana Yu. Alekhina, Andrey V. Tyukhtin

*Saint Petersburg State University, 7/9 Universitetskaya nab., St.
Petersburg, 199034 Russia*

Abstract

We analyze the electromagnetic field of a charged particle that moves uniformly in a circular waveguide and crosses a boundary between a vacuum area and an area filled with a left-handed medium exhibiting resonant frequency dispersion. The investigation of the waveguide mode components is performed analytically and numerically. The reversed Cherenkov radiation in the filled area of the waveguide and the reversed Cherenkov-transition radiation (RCTR) in the vacuum area are analyzed. The conditions for the excitation of RCTR are obtained. It is shown that the number of modes of RCTR is always finite; in particular, under certain conditions, the RCTR is composed of the first waveguide mode only. Plots of the typical fields of the excited waveguide mode are presented.

Keywords: Left-handed medium, reversed Cherenkov-transition radiation, transition radiation, moving charge, waveguide, frequency dispersion

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