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Cherenkov Radiation in Homogeneous Isotropic Chiral Media

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Abstract: We present a Fourier transform analysis of Cherenkov radiation for a point charge uniformly moving inside a 2D-homogeneous, isotropic, unbounded, chiral medium endowed with the Drude-Born-Fedorov constitutive relations when the chirality parameter ß and the wave number k make negligible the $ß^2k^2$ terms. The electromagnetic field is not described in terms of circularly right and left polarized waves but in terms of TM and TE components. The Cherenkov radiation arises when the velocity v of the point charge is greater than the phase velocity c/n, where n is the refractive index of the chiral medium and the electromagnetic field stands inside the Mach cone with opening angle c/nv.

Key Words: Cherenkov, chiral, charge, Fourier, TM, TE waves.