

Abstract Submitted
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Anomalous steady state nonlinear dielectric and Kerr effect relaxation responses in superimposed ac and dc electric fields WILLIAM COFFEY, Dept. Electronic and Electrical Engineering, Trinity College, Dublin 2, Ireland, YURI KALMYKOV, MEPS, Université de Perpignan, 52 Av. Paul Alduy, 66860 Perpignan Cedex, France, SERGEY TITOV, Inst. Radio Engineering and Electronics of the Russian Academy of Sciences, Vvedenskii Square 1, Fryazino, Moscow Region, 141190, Russia — It is shown how the Debye rotational diffusion model of polar molecules (which may be described in microscopic fashion as the diffusion limit of a discrete time random walk on the surface of the unit sphere) may be extended to anomalous nonlinear dielectric relaxation and the dynamic Kerr effect by using a fractional kinetic equation for the Havriliak-Negami (HN) model. The equation is obtained via a generalization of the noninertial kinetic equation of conventional rotational Brownian motion to fractional kinetics governed by the HN relaxation mechanism and is solved using matrix continued fractions yielding the complex nonlinear dielectric susceptibility and the Kerr function.

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