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A careful comparison between ray tracing and full wave approaches to lower hybrid current drive[1] JOHN WRIGHT, PSFC-MIT — Lower hybrid (LH) waves in fusion plasmas have perpendicular wavelengths of $\approx$ 0.5 mm and parallel wavelengths of $\approx$ 1cm. Historically, the propogation and power deposition of these waves has been modeled by coupled geometric optics (ray tracing) and Fokker-Planck codes. In the past few years several authors have sought to address the effects of physical optics on LH propogation and power and current deposition [Wright, J. et al *Phys. Plasmas* **17** 056119 (2009) ;Meneghini, O. et al *Phys. Plasmas*]. In these works, differences between ray tracing and full wave or beam tracing are attributed to physical optics effects such as diffraction and focusing or the treatment of ray caustics and reflections. We show that some observed differences are due to the differences in the correspondance between initial or boundary conditions between the two approaches or differences in dielectric models. Focusing at caustics is identified as the primary cause of remaining differences in the case of linear damping. When evolution of the electron distribution function is taken into account we see more significant differences that we show are due to effects of interference in quasilinear diffusion that are captured in the fullwave approach.

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