

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Ray-tracing studies of fast waves in the lower hybrid range of frequencies¹ A. DITTMAN, University of Illinois, R.I. PINSKER, General Atomics — Fast waves in the lower-hybrid range of frequencies, also referred to as 'whistlers' or 'helicons', will be used in the DIII-D tokamak for off-axis non-inductive current drive. Ray-tracing studies have shown² that the required off-axis deposition can be achieved in target plasmas that have been recently studied in DIII-D. We wish to characterize the sensitivity of the rf power deposition profile to details of the equilibrium, and are thereby motivated to re-examine the fundamentals of ray-tracing in this regime. We have studied ray-tracing in the vicinity of regular turning points (cut-offs) and mode-coupling points in simple geometries (slab, cylinder). Later phases of the work will use the GENRAY code to study the effect of strong magnetic shear in the outer region of the plasma on the shape of the ray trajectory in that region, and on wave accessibility to the core. The usual estimate of the accessibility limit on the parallel index of refraction of the wave (n_{\parallel}), based on a slab model, is inaccurate under these conditions, which could lead to improved antenna/wave coupling by utilizing a lower n_{\parallel} .

¹Work supported in part by US DoE under the Science Undergraduate Laboratory Internship (SULI) program and under DE-FC02-04ER54698.

²R. Prater, C.P. Moeller, R.I. Pinsker, *et al.*, Nucl. Fusion **54** (2014) 083024.

A. Dittman
University of Illinois

Date submitted: 11 Jul 2016

Electronic form version 1.4