

Abstract Submitted
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Interpreting Doppler backscattering with beam tracing and reciprocity in tokamak geometry¹ VALERIAN HALL-CHEN, University of Oxford, CCFE, FELIX PARRA, University of Oxford, JON HILLESHEIM, CCFE — We use beam tracing (Torbeam² as well as a newly written code) and the reciprocity theorem³ to derive a model for the backscattered power of the Doppler Backscattering (DBS) diagnostic. Our model works for both the O-mode and X-mode in tokamak geometry. We present the analytical derivation of our model, providing an understanding of how the DBS signal is localised and the quantitative effect of the mismatch angle. Consequently, one can now correct for the attenuation due to mismatch, avoiding the need for empirical optimisation. We then use our model to determine the wavenumber resolution and find different results from the widely-accepted formula⁴.

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