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PiC simulations of the anomalous Doppler resonance for a scaled laboratory experiment R. BRYSON, D.C. SPIERS, M. KING, A.D.R. PHELPS, S.L. MCCONVILLE, K.M. GILLESPIE, K. RONALD, University of Strathclyde, I. VORGUL, R.A. CAIRNS, University of St Andrews, R. BINGHAM, STFC Rutherford Appleton Laboratory — The anomalous Doppler resonance occurs due to coupling between a negative harmonic of the electron cyclotron frequency and an electromagnetic wave, as such this regime is only applicable in slow-wave media like a plasma or dielectric loaded waveguide. In nuclear fusion devices the generation of fast electrons by Lower Hybrid Current Drive or in extreme cases Dreicer acceleration, can lead to the criterion for the anomalous Doppler resonance being fulfilled. The anomalous Doppler resonance is also relevant in the nature of pulsar radio emission. Simulations have been developed to study non-thermal electrons drifting at relativistic velocities along a magnetic field with a background plasma acting as the slow-wave media. The simulations will be used to inform the design of a scaled laboratory experiment at Strathclyde, the results of which will be used to compare with the prediction of the numerical simulations and analytical theory. Once benchmarked by the experiment simulations will investigate regimes relevant to tokamak and astrophysical plasmas.

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