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The effects of non-uniform magnetic field strength on test particle transport in drift wave turbulence RICHARD DENDY, UKAEA Culham, JOSEPH DEWHURST, BOGDAN HNAT, Warwick University — Our model of drift turbulence is a modified form of the Hasegawa-Wakatani equations, extended to include magnetic field inhomogeneity in the radial direction, thus incorporating interchange modes. Direct numerical simulation of this system yields local time series for: the turbulent E x B radial density flux Γ, whose probability density function (PDF) is analyzed in terms of skewness and kurtosis; and the relative phase and amplitude of fluctuations in density n, electrostatic potential ϕ and radial velocity v. We investigate how changes in the magnitude C of the magnetic field inhomogeneity affect the relative phases of n, ϕ and v and in consequence the skewness of the PDF of Γ. This is a consequence of the shift from drift to drift-interchange turbulence. The challenge is then to identify a Fickian expression linking Γ to the radial diffusivity that embodies C as a parameter, while noting the conservation of potential vorticity. This is achieved, assisted and confirmed by statistical analysis of the transport of ensembles of test particles in stationary turbulence and by measurements of the decay of correlation in potential vorticity.

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