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Multimode wave-particle interactions and the quasilinear transition RODERICK VANN, University of York, U.K., BORIS BREIZMAN, University of Texas at Austin — Multiple mode interactions are ubiquitous in fusions plasmas. In the generic kinetic picture, the excitation of waves leads to the formation of potential wells corresponding to islands in phase space in which some of the particles are trapped. Island coalescence may lead to energy avalanche across a large phase space region. In the limit that modes are far apart (i.e. their island widths are much less than the mode separation), the particle dynamics of the modes can be treated independently; if there are many modes close together, the quasilinear approximation applies and multimode interactions may be treated as a diffusion in velocity space. We consider the intermediate regime of several modes whose island widths are comparable to their separation and investigate under what conditions the modes interact. Our Vlasovian model equations allow for an arbitrary number of modes which couple solely through the spatially-averaged component. The equations are integrated via a time-splitting algorithm which calculates the advective terms using the Piecewise Parabolic Method. The code has already successfully been applied in the single mode case (e.g. to study mode chirping); it is extended to handle multiple modes via a Fourier representation in velocity space. In this Poster we introduce the numerical algorithm and present preliminary results of multimode coupling. This work was funded in part by Euratom and the UK EPSRC.

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