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Modulational Instabilities and wave Collapse Driven by Broadband Turbulence N.J. SIRCOMBE, University of Warwick, R. TRINES, Rutherford Appleton Laboratory, L.O. SILVA, GOLP, Lisboa, Portugal, P.K. SHUKLA, Institut fur Theoretische Physik IV, Bochum, Germany, J.T. MENDONCA, GoLP, Lisbon, Portugal, M. DUNLOP, Rutherford Appleton Laboratory, M. SHERLOCK, J. DAVIES, R. BINGHAM, Rutherford Appleton Laboratory, Didcot, Oxon — The interaction of broadband turbulence with plasmas has been studied in a number of regimes. Beam instabilities occur in this interaction when the phase velocity of the long- wavelength monochromatic wave is nearly equal to the group velocity of short-wavelength wavepackets, or quasi-particles, associated with the turbulent spectrum. It is shown that quasi-particle Landau-damping can take place, as well as quasi-particle modulational instabilities, thus establishing a direct link between short- and long-wavelength perturbations of the medium. Numerical simulations are reported for three cases (i) intense laser pulse driving a plasma wakefield, for use in plasma-based acceleration. (ii) a broadband distribution of drift modes coupling to zonal flows in a tokamak-like configuration, as well as the magnetopause, and (iii) wave collapse of strong Langmuir turbulence driven by electron beams.

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