



On particle heating by the decay of large amplitude Alfvén waves

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A comparison study for the decay of a monochromatic Alfvén pump wave is proposed by using two and three dimensional hybrid simulations in low beta plasmas. Although parametric decay is mainly a one dimensional process, the feedback of plasma at later times in the non linear saturation stage of the instability is different. We found that the energy transfer from the pump wave to particles initiated by the parametric decay is significantly improved in the 3D scenario. While in the 2D system plasma is mainly heated due to the spatial modulation of the density followed by the enhancement of the parallel electric field, additional processes are developed in the 3D system and plasma is strongly heated along the perpendicular direction with respect to the mean magnetic field. We discuss on the mechanisms responsible for the perpendicular heating and on the consequences in different astrophysical scenarios.