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**Residual coherent structures after 1-D electron wave breaking in a cold plasma** PRABAL SINGH VERMA, SUDIP SENGUPTA, PREDHIMAN KAW, Institute for Plasma Research, Gandhinagar - 382428 — 1-D particle in cell simulation of large amplitude plasma oscillations is carried out to explore the physics beyond wave breaking in a cold homogeneous unmagnetized plasma. It is shown that after wave breaking all energy of the plasma oscillation does not end up as random kinetic energy of particles but some fraction which is decided by Coffey's wave breaking limit in warm plasma, always remains with two oppositely propagating coherent BGK like modes with supporting trapped particle distributions. The randomized energy distribution of untrapped particles is found to be characteristically non-Maxwellian with a preponderance of energetic particles. Furthermore, we study long time evolution of large amplitude traveling waves in the beyond wave breaking regime and find that in this case also some fraction of initial energy remains in the form of a single BGK type wave. We believe that these results may have relevance in particle acceleration experiments.

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