A decay of Electromagnetic Wave Quanta in a Turbulent Plasma during their Interaction with Langmuir Waves

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We stated that traditional approaches to nonlinear plasma studies cannot provide appropriate level of reliability of final conclusions [1–4]. An alternative machinery of developing nonlinear plasma scenarios was created, one aimed at heightening of the informativeness of theoretical deductions [5]. Now we apply it to study of dissipation of electromagnetic waves in homogeneous turbulent plasma. We show that the interaction of these waves with Langmuir ones induces a stochastic plasma electron acceleration that efficiently thermalizes the wave energy. This observation complies well with formerly highlighted collisionless dissipation of Langmuir turbulence in the run of wave interactions [2]. Thus, the Langmuir and electromagnetic waves generally help each other in thermalizing their energies (i.e., in transforming the latter into the heat plasma electron energy).

References

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