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Stimulated Brillouin scattering driven by broadband radiation
LUIS SILVA, JORGE SANTOS, GoLP/CFP, Instituto Superior Tecnico, Portugal, R. BINGHAM, Rutherford Appleton Laboratory, UK — The interaction of intense radiation with plasmas is a problem of paramount importance in a wide range of scenarios. When the radiation pulse length is comparable or larger than the typical time scale of the ion dynamics, not only stimulated Raman scattering can occur, but also stimulated Brillouin scattering (SBS) plays an important role. In this work, we employ the formalism based on the Wigner description of the Klein- Gordon equation (see J. E. Santos, L. O. Silva, R. Bingham, this conference) to understand how the broadband features of the pump laser determine the growth rate of SBS. This formalism is based on a statistical description of the electromagnetic field, in the photon phase-space, thus allowing for the description of arbitrary fields, with random statistics or not. We explore the role played by a broadband pump field. For a monochromatic pump we recover the standard growth rates for SBS. Our model also yields the generalized dispersion relation for SBS with an arbitrary statistics of the field. The generalized dispersion relation is analyzed for simple photon distribution functions for which analytical results can be derived. Conditions on the pump bandwidth leading to SBS supression are also discussed.

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