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Stimulated Brillouin scattering driven by broadband radiation
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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 suppression are also discussed.

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