LONGITUDINAL, ELECTROSTATIC INSTABILITIES IN THE CHANNELED BLAST WAVE MODEL

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In an attempt to address the important issue how the kinetic energy of collimated blast waves is converted into radiation, Pohl and Schlickeiser (2000) have recently investigated the relativistic two-stream instability of electromagnetic turbulence. These authors have shown that swept-up matter is quickly isotropized in the blast wave, which provides relativistic particles and, as a result, radiation.
Here we present new calculations for the electrostatic instability in such systems. It is shown that the electrostatic instability is faster than the electromagnetic one also for highly relativistic beams. However, even after relaxation of the beam versus the faster electrostatic turbulence, the beam is still unstable with respect to the electromagnetic waves, thus providing the isotropization required for efficient production of radiation. While the emission spectra in the model of Pohl and Schlickeiser have to be weakly modified, the basic characteristics persist.