Abstract Submitted
for the APR06 Meeting of
The American Physical Society

Diagnostics of Weibel Turbulence by Anisotropic Radiation Spectra[1] SARAH REYNOLDS, MIKHAIL MEDVEDEV, University of Kansas —
It has recently been realized that the Weibel instability plays a major role in the formation and dynamics of astrophysical shocks of gamma-ray bursts and supernovae. Thanks to technological advances in the recent years, experimental studies of the Weibel instability are now possible in laser- plasma interaction devices. We, thus, have a unique opportunity to model and study astrophysical conditions in laboratory experiments – a key goal of the Laboratory Astrophysics program. At this stage, accurate diagnostic techniques are of great demand. In this presentation, we will discuss the properties of radiation emitted by electrons (e.g., an electron beam) moving through the Weibel-generated magnetic fields, referred to as the jitter radiation. We'll demonstrate that the jitter radiation field is anisotropic with respect to the direction of the Weibel current filaments and that its spectral and polarization characteristics are determined by microphysical plasma parameters. We stress that the spectral analysis will provide accurate diagnostics of the plasma conditions in laboratory experiments and in astrophysical shocks.

[1]This work is supported by DOE grant DE-FG02-04ER54790

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Date submitted: 13 Jan 2006 Electronic form version 1.4