

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

**Measurements and Computations of the Visible Light Spectrum
Emitted from the Ionized Surface of Ohmically Heated Aluminum Rods¹**

R.E. SIEMON, T.S. GOODRICH, B.S. BAUER, S. FUELLING, I.R. LINDEMUTH,
University of Nevada, Reno, T.J. AWE, LANL — Measurements have been reported
of surface brightness temperature for green light in the UNR rod heating exper-
iments (other papers these proceedings and Invited Presentation by T. J. Awe.).
We also measured the entire visible spectrum to compare with a blackbody (T.
S. Goodrich, M.S. Thesis, UNR, 2010). Results show a spectrum measurably dif-
ferent than a blackbody. Numerical modeling suggests the following interpretation.
Bremsstrahlung is the primary emission and absorption process from aluminum with
 $Z\sim 3$. Deviation from a blackbody occurs under some conditions (lower temperatures
early in time) because the optical thickness is less than unity, and the spectrum tends
towards that of bremsstrahlung. Under other conditions (higher temperatures later
in time) the optical depth can be above unity, but a temperature gradient length
comparable to the absorption length alters the emission spectrum. The comparison
of experiment and modeling allows an estimate of plasma density, which is difficult
to measure directly, and in general adds credence to numerical modeling.

¹Supported by DOE grants DE-FG02-04ER54752 and DE-FC52-06NA27616.

Richard Siemon
University of Nevada, Reno

Date submitted: 20 Jul 2010

Electronic form version 1.4