

## Understanding the effects of preheat from the Au M-band and L-band hohlraum radiation on EOS experiments

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In this talk we look at the effect of the Au M-band and L-band hohlraum radiation on preheating the EOS sample in experiments done at the NIF laser facility. In particular we examine EOS experiments that were done using a Mach Stem shock wave created by putting a plastic CH cone inside the hohlraum with the EOS sample outside the hohlraum at the base of the cone, as shown in Fig. 1. The EOS sample consisted of Au and CH steps. The experiments measured the shock breakout times from the steps and used impedance matching of Au vs CH to determine a point on the Hugoniot for Au. The experiments were able to create planar shocks at pressures above 500 Mbar in the Au.

In this talk we show the importance of preheat effects from the Au M-band and L-band hohlraum radiation and how we were able to mitigate some of these effects by doping the plastic cone with Ge. The preheat causes the Au sample to heat and undergo hydrodynamic motion before the main Mach Stem shock arrives and it is important to minimize and understand the effect of the preheat on the interpretation of the experimental results. Unlike EOS experiments on lower-Z materials the effect of the L-band radiation is very important and more difficult to eliminate.

The preheat is a general issue for EOS experiments that needs to be understood and is not unique to the Mach Stem platform.

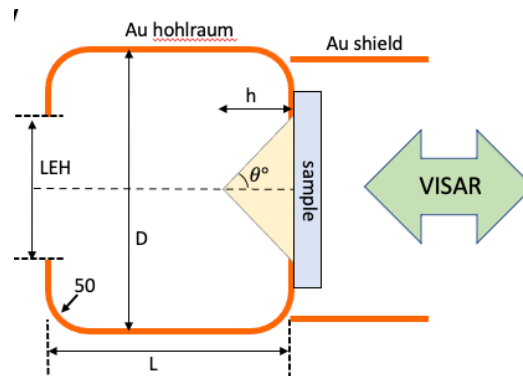


Figure 1. Mach Stem geometry for EOS experiments [1].

### References

[1] Amy Lazicki (Jenei) et al., "Mach wave drive for ultra-high pressure plasma equation of state measurements," 63<sup>rd</sup> Annual Meeting of the APS Division of Plasma Physics, LLNL-PRES-829723.

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