NIF gas hohlraum flux multipliers modeling from scratch

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All the indirect-drive NIF shots made in recent years exhibit a marked X-ray flux deficit ([1]), up to 40% of lost power, particularly during the rise of the laser power peak and with a high He gas density.

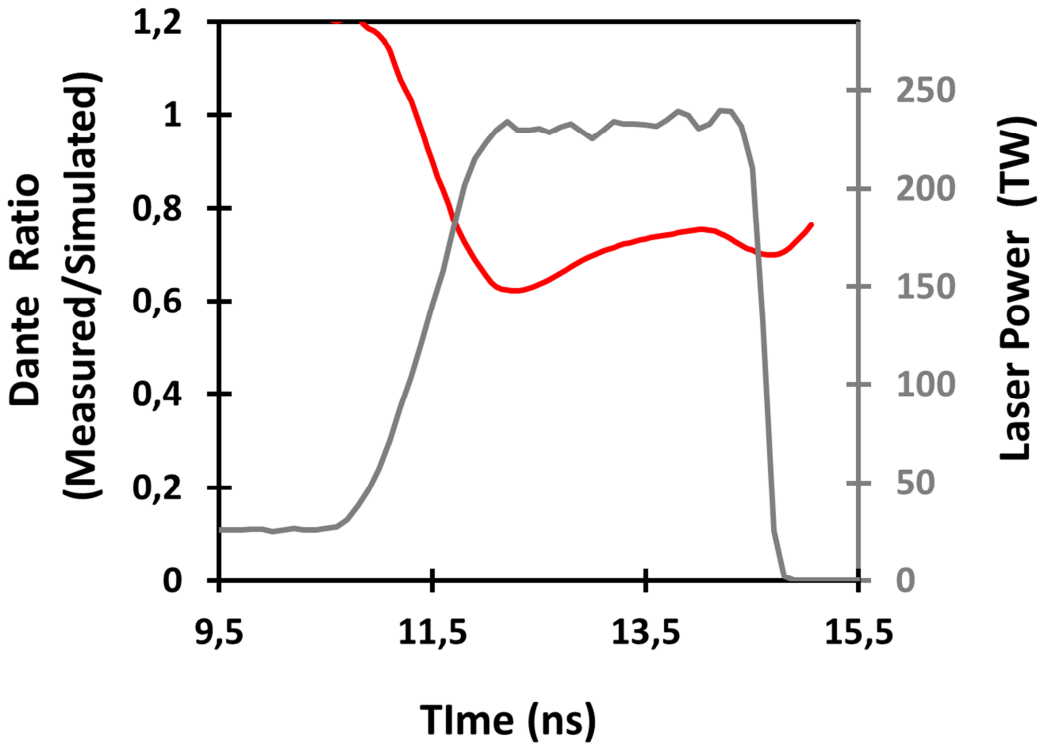

Figure 1: typical NIF High Foot shot flux multiplier (courtesy LLNL D. Callahan / S. McLaren / M. Schneider)

We propose here a complete modeling and 1D calculation of this phenomenon by assuming a turbulent behavior of the wall / gas interface coupled with a relevant NLTE model to best evaluate the radiative efficiency of the mixed wall. The probable cause of the turbulence is specified by the direct drive shots N160204 / N160205 and we then apply our model to 2 UHP experiments, N151103 and N151220, the latter showing a significant delay of bang-time remained unexplained until now.

References

[1] O. Jones *et al.*, EPJ Conf. **59**, 02009 (2013)