

Sandy,

We appreciate the referee's detailed and thoughtful comments. We have made nearly all of the changes he or she has suggested. Interspersed with the referee's comments below are our responses - which you may share with the referee - including notes about each of the requested changes and explanations in the few cases where we did not make exactly the changes requested.

Note, specifically, that in two cases where we did not make all the changes to figures requested by the referee, we have made alternate versions of the figures and made them available for the referee's inspection.

David

>
>Dear Prof. Cohen,
>
>We have received the referee's comments on your paper "Numerical Modeling of
>Hohlraum Radiation Conditions: Spatial
>and Spectral Variations Due to Sample Position, Beam Pointing, and Hohlraum
>Geometry." Though largely positive, there are recommendations for revision.
>Please revise your manuscript and submit a detailed response to the referee.
>The revised manuscript and response are due by September 24, 2005. The Editors
>will then make the decision as to the next step in the review process.
>
>Please feel free to contact the Editorial Office if you have any questions or
>concerns.
>
>Sincerely,
>
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>Manuscript #POP28745A:
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>Reviewer Comments:
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> The authors have significantly improved their manuscript, and eliminated a
>lot of unnecessary figures. There are a few more figures that can be removed
>without detracting at all from the content of the paper. I note that the
>authors state they are open to making more changes to the figures. With the
>changes suggested here (many minor), the paper should be suitable for

>publication.

The paper has certainly been improved due to your suggestions. We have modified the figures as suggested, reducing them in number and eliminating duplications. Specific comments are given below, in reply to each comment, and denoted in this font.

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>1. In the abstract, the acronym "HED" does not need to be used.

Removed.

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>2. p. 4. The sentence in the middle of the page starting with "Finally,..."
>is muddled and should be rewritten with greater clarity ("variations in"
>doesn't really apply to everything in the list, and there are too many "and"s).

>

Fixed: split into two separate sentences.

>

>3. p. 5. Just below the middle, Fig. 2 might be described better as a
>"schematic" than as a "sketch." Line 2 from the bottom, say that the albedo is
>assumed to be spatially uniform. This will then be justified in the text (see
>point 23 below).

>

Fixed. Suggestions from point 23 incorporated too - reference and additional half sentence. And at the bottom of (the old) page six, more changes related to the discussions of the albedo calculation and assumed spatial uniformity (see next comment too).

>

>4. p. 6, bottom two lines. The implication is that the x-ray drive has
>constant power. Clarify that it's a constant-power laser pulse producing an
>increasing radiation drive.

Done; paragraph split into two also to accommodate Schnittman reference and justification of assumed spatial uniformity of the albedo.

>

>

>5. p. 7. Move the definition of the Stefan-Boltzmann constant to a few lines
>earlier, where it's first used.

>

Done.

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>6. p. 10, middle. "time-dependence" shouldn't have a hyphen.

>

Fixed.

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>7. p. 14, end of para. 3, I'm not convinced by the explanation for the dramatic

>increase of DANTE temperature as the pointing becomes deeper. Comparing Figs.
>12 and 13, the temperature without the lip at the shallowest beam pointing is
>slightly lower than with the lip. This can certainly be ascribed to larger LEH
>losses. However, what happens at shallow beam pointings is surely irrelevant
>to observations of what occurs when the pointing becomes deeper.
>

We have added a sentence to this effect. We also think that the less dramatic increase in the DANTE temperature with deeper pointing in the no-lip case is because the no-lip DANTE view - having a bigger solid angle than the corresponding view with the lip - effectively dilutes the hot spot emission and the relatively hot wall reemission from deeper in the halfraum with relatively cool wall reemission from the shallower portion of the halfraum wall, which is occluded by the lip in the case of the three-quarter LEH.

>
>7a. p. 16, line 3 of Para. 2 should read "simulations" not "experiments."
>

Fixed.

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>Comments on figures.
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>8. The figures are greatly improved by the addition of white ellipses around
>the lip. This should definitely be done also in Fig. 1(b) and, if possible,
>Fig. 1(a).
>

Well, there's a problem, which is that VisRad does not have this capability (of adding lines, ellipses, etc. to highlight the edges of surfaces) built into it. For this paper, we've added the ellipses after the fact using Photoshop. This is fine, except in the cases where there are laser beams. In those cases, the ellipses - by the nature of our post-processing solution - lie under the ellipses, when, in fact, they really should be on top of them. At this point, there's really nothing we can do about this. We hope you will accept the compromise of white ellipses everywhere it is possible to add them in a way that adds to the readers' understanding, but leaving them out where their addition would lead to confusion (i.e. those cases where the beams are shown).

We have left Fig. 1 as-is, but to demonstrate the situation, we have made an alternative version of the figure with ellipses added to the middle panel. You can view it at:
http://astro.swarthmore.edu/~cohen/projects/hohlraum/resubmitted_v2/fig1_alt.ps

If you think that this alternate figure is actually preferable, we would consider using it instead. Have a look, and let us know.

>
>9. Fig. 10(a) is identical to Fig. 1(c) and should be removed. It is
>conventional in publications that a figure is not inserted twice to save the
>reader from having to refer back to an earlier figure. Fig. 10(b) is fine,
>except that the extraneous blue ring in the bottom left should be removed. The
>text on p. 12, 8 lines from the bottom, should read, "The DANTE view of the
>halfraum is shown in Fig. 10, which may be compared with the view of the
>corresponding hohlraum in Fig. 1(c)." On the last line, "By comparing Fig. 10
>with Fig. 1(c) it is clear..."
>

We have removed the extraneous panel and changed the reference in the text (and caption).

>
>10. In Fig. 11, the right-hand column should be omitted. In contrast to the
>clear figures on the left, it's hard to understand what the figures on the
>right mean or what significant additional information they convey. The
>right-hand column isn't even mentioned in the text. The figures on the left
>show very clearly what is happening as the laser spots move inwards. Removal
>of the right column will also help the reader focus on the main message. Also,
>the four images should be labeled with the focus positions, preferably on the
>figures but possibly in the caption.
>

We have removed the right hand column and also the redundant panel from the left hand column (so the figure now has just three panels). Corresponding changes have been made to the text and the caption (the pointings are called out in the caption rather than labeled on the images).

>
>11. Unfortunately, we still have some redundancy, because Fig. 10 is now the
>same as Fig. 11(b). We cannot have the same picture reproduced twice in
>adjacent figures. The authors should choose one of two ways to fix this:
>

Agreed. We went with option (a), here.

>
>(a) Remove the second image from Fig. 11 and change its caption to read
>something like, "As Fig. 10, but for three other beam pointings...". The main
>message isn't compromised at all.
>
>
>(b) Replace Fig. 10 with the four (left-column) images of Fig. 11, introduce
>the figure as containing four beam pointings, and then focus the discussion on
>the second one, which can be compared with Fig. 1(c), before moving to a
>discussion of dependence on pointing position.
>
>
>12. In Figs. 12 and 13, do we need "mean" on the x axis as both rings have the
>same position? Where the rings are separate, we do of course need "mean." (On
>p. 15, on line 7, it might help to say that the weighted mean of ten beams at
>480 and 5 at 890 is 617.)

Fixed all.

>
>
>13. In Fig. 17, the bottom two figures should be deleted. The bottom left
>repeats Fig. 5(a). The top left should have the white ellipses added, and so
>should the top right. In this case the view from the midplane is worth
>including because it shows both the temperature on the inside of the shield and
>the solid angle of the shield as seen by the point in the midplane. Again,
>nothing is lost by referring the reader back to Fig. 5(a) to make the point
>that the shield obstructs DANTE's view of a hot spot.
>

Fixed.

>
>14. Fig. 18. I agree with the authors that it is useful to see the beam paths
>to the external shield. I have no problem with the left figures, except that
>the white ellipses should be added. I would also add the ellipses to the right
>figures, for consistency, and remove the grid from the black annular region
>where it is confusing. The caption might say that the outer portion of the
>image corresponds to the intersection of the end cap with the cylindrical
>surface.
>

For the same reason it was problematic to add white ellipses to the top panels in Fig. 1, we cannot add them to the left-hand panels in this figure (without introducing a misleading perception of the position of the laser beams). For technical reasons, we also cannot simply remove the mesh (representing the back of the halfraum) from the right-hand panels. However, by moving the viewer's position farther in, toward the LEH, we can "go past" the back wall of the halfraum. This gives us less of a view of the barrel of the halfraum, though. We have produced several alternate versions of this figure, including ellipses on the left-hand panels and reverting to the original viewing position for the right-hand panels (but with ellipses). These alternatives are available for you to view at:

http://astro.swarthmore.edu/~cohen/projects/hohlraum/resubmitted_v2/fig17_alt1.ps
http://astro.swarthmore.edu/~cohen/projects/hohlraum/resubmitted_v2/fig17_alt2.ps
http://astro.swarthmore.edu/~cohen/projects/hohlraum/resubmitted_v2/fig17_alt3.ps
http://astro.swarthmore.edu/~cohen/projects/hohlraum/resubmitted_v2/fig17_alt4.ps

Note that version 3 is our preference and is the one included in the manuscript at this point. If you think one of the others is better, we'd be open to making a change.

>
>Figure captions.
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>
>15. Fig. 5. Delete, "as is true ... the paper, it" as this repeats what's
>already been said in the Fig. 1 caption.
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>
>16. Fig. 6. Delete the last sentence, again because it's repetitive. A
>similar comment can be removed from the Fig. 10 caption.
>
>
>17. Fig. 12. Delete "(three-quarter LEH, hot spots in a single ring)" as
>repetitive. In the last sentence, say "position is measured with respect to
>.....".
>
>
>18. Fig. 13. It's much clearer to say, "Same as Fig. 12 but with no LEH lip
>(i.e., 100% LEH)" and omit the rest.
>
>
>19. Fig. 14. Similarly, this can be shortened saying, "Same as Fig. 12 but
>with the two beam cones..."
>

We made the suggested changes for these first five captions.

>
>20. Fig. 15. It should be stated what the pointings are. Also, consider
>merging Figs. 15 and 16 into a single figure, i.e., with two separate graphs
>but a single caption. This would save some repetition in the present two
>captions.
>

We have merged these figures.

>
>21. Fig. 17. Do we understand correctly that the outside of the shield (blue)
>is at 140 eV, based on the color map on Fig. 1?
>

A surface element at the center of the back of the shield has a temperature of 149 eV, and elements nearer the edge have temperatures approaching 160 eV.

>
>22. Fig. 19. It seems that the dotted line of Fig. 19 should match the dashed
>line of Fig. 9. However, overlaying the two figures, it seems that the dashed
>line of Fig. 19 matches.
>

No, they should be similar, but not identical. Fig. 9 is for a hohlraum while Fig. 19 (now 18) is for a halfraum.

>
>Response to my report.
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>
>23. I would favor adding the comments about albedo calculation, spatial
>uniformity of the albedo, and plastic albedo. Include the Golovkin, Schnittman
>and Murakami references. On the albedo, the level of description in the
>response is fine, but I would say "infinite gold slabs" if that is the case (as
>I presume). Reference to the Schnittman figure to show that a spatially
>uniform albedo is indeed an excellent assumption strengthens the value of the
>present work. For the plastic albedo, I much prefer a reference to Eq. (2.6)
>of Murakami to a number used without explanation. I don't think the absolute
>number is important for this work - the authors describe clearly the overall
>result (lower temperatures but the same spatial pattern). (I might add, as an
>aside, that I distrust scaling laws such as this equation, especially when they
>predict in excess of 100% conversion if you wait long enough.)
>

We have added the three references. We have elaborated on the discussion of the albedo calculations (including adding the phrase "infinite gold slabs"); we have added two sentences about the assumption of spatial uniformity of the albedo. We agree with the referee's caveat about scaling relations but note that, like most approximations, they have their place when used in the appropriate regimes.

>
>24. For the most part, the other changes described by the authors are fine.
>They made a good case for keeping (most) of Figs. 17 and 18, but I think
>elimination of the figures I've suggested above, especially the duplicates,
>will improve the manuscript further, making it easier for the reader to absorb
>the main points.
>

Once again, we appreciate the referee's suggestions, and also appreciate being allowed to keep some of the illustrative figures.