3.46 Photonics Materials and Devices

Design Review 1 (DR1)

March 13, 2006

The Design Reviews today were very well presented; we were impressed with the content, design, and presentation skills. Bravo!

For Wednesday, March 15, each group is expected to deliver a 2-page write-up that incorporates suggestions and answers questions raised by the lecturers during presentation. This write-up should be in 12 point font, single-space text. It does not need to be rigorously two pages long, and can run in length from 1-2 pages—but it should not exceed two pages! Please take note below of specific comments addressed to each design team.

You have also been asked for Wednesday to submit an edited version of your presentation, one that concisely presents your design review as one slide per presenter. For guidelines on editing your presentation, please refer to the Global Comments that follow below, after the DR1 Comments. These Global Comments will also apply to your presentations for Design Reviews 2 and 3.

DR1 Comments

Team Broadband: Ridge Waveguide Project
Connect your final Helmholtz equation-based design with the Ray Optics-based Design Plot. Show us that the Ray Optic Design plot is a fast, intuitive process that allows you to make an intelligent guess at the more precise Helmholtz equation calculation. Try to define the vertical axis of this Ray Optic Design plot as a design Figure of Merit.

Team Ultrafast: Silicon Solar Cell Project
Explain your first figure in detail (the one with red, blue and green spectral plots) by discussing how this figure: (1) summarizes your project statement of problem, and (2) leads to your design solution. State clearly what assumptions or design simplifications you made.

Team Superluminescent: Bragg Reflector Design
Your presentation focused on a nominal and deviations from this design due to index and film thickness error. Conclude by presenting a final design solution whose performance can meet specification while accommodating these error tolerances.

Team High-Q: Optical Fiber Design
Conclude with a decision on which design is better for your hybrid wavelength application: graded index or step index profile. Can this conclusion apply to your exclusive 1.3 and 1.5 μm applications? Your fiber loss equation appears to be the loss equation for Rayleigh scattering. This is a material scattering loss within the core, and not the core-cladding interface loss. Use the core-cladding interface loss graph from the "Si Microphotonics" reference given to you, to develop an empirical core-cladding interface loss formula.

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We now list a series of Global Comments for helping you with editing your current presentations to a more concise and precise form, for Wednesday, March 15, submission.

Global Comments

The lecturers made a series of observations concerning presentation efficiency that we would like you to institute from here onwards, in order to optimize your presentation impact. It is important to recognize that your Design Review is the verbal equivalent of an Optics Letter or an Applied Physics Letter: your goal is to define a problem, state its solution, present the constraints and approach to solution, and re-state the solution once more in conclusion. A good Letter delivers its message in 3-4 graphs (under a typical page limit of 2000 words). It is a similar spirit of concision and precision that we want you to embrace. By being concise and precise in your statement of problem and solution, you will optimize your grading for the Design Review, not to mention your skills at scientific presentation!

Here are some general comments:

For future Design Reviews, students should plan to present one slide per person, planning to discuss the material on this slide for 1-2 minutes.

The content of each slide should be distilled into one graph, with no more than 5 key comments. The key comments should be numbered 1-5. While talking, be certain to discuss each point.

One of the presenters will be allowed to present two slides: their content slide and an Introduction slide. The Introduction slide must present two things: what is the statement of problem and which student in the group will be addressing what aspect of the solution. You should not spend more than 1 minute on the Introduction slide.

Minimize the presence of math in your slides; rather, present your math analysis in the form of the graph. Where possible, feel free to reference a specific class lecture.

For your final design solution or important quantitative values, use small tables at the bottom of your graph.

Practice your single slide presentation and strive to deliver it within 1 to 1.5 minutes. There is a common rule of thumb observed by presenters at scientific conferences: the average presenter will spend 2-3 minutes per slide. Even if you rehearse yourself to take less time, during actual presentation, it has been noted that presenters tend to slow down a bit. Therefore, we want you to be careful of this in your planned time budget.

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Groups will vary in size from 4-6 members; this means presentations should run in length from 9-13 minutes. If you can adhere to such a time interval, you will be able to benefit from a 10 minute Question and Answer session.

Don't feel frustrated regarding the concision forced on you by the 1-slide requirement. If you feel there is particular material that is worth developing further, you can try to discuss that during the Question and Answer session. If not, you'll still have the chance to present a more detailed discussion in your 2-page write-up.

Speak slowly and clearly, leaning forwards and close to your microphone.

Good luck wrapping up for Wednesday.