Hi Professor

This week I didn’t do laser testing since the gas is running out , and the new bottle of gas will be arrived on Feb. 11. I have talked with Jon and Calvin about the next step, and the discussion is recorded in the experiment log.( https://app.box.com/s/hnwy5gf60s6fvmzqfh1szk3uzcyvttu1)

Since the beam profile is quite sensitive to the angle of metallic mesh, and it is quite difficult to adjust metallic mesh in the laser system. Beside this , the mesh angle also influenced by the thermal expansion . Jon will design a new setup to set the mesh out side of the laser system , so we could adjust the mesh angle outside much easy with manual. And the temperature influence would be much decrease compared with inside the laser system. Temporary the window for seal the vacuum is going to made with flat window by PTFE material for low expense , this window will have 88% -100% transmission for 693 Ghz ,depending on the thickness of the window, this reflection may cause FIR energy loss due tp lack the best resonant condition. If we could get good beam profile, Jon will help to upgrade the window to Brewster window in the future , which could have nearly 100 % transmission.

Now I am writing the document talking about the basic structure of laser system and alignment method and some laser results we got from experiment , I am going to share the main results for future laser adjustment after finishing the document

Dear Professor,

This week, I did not conduct laser testing as the gas supply is running low. A new gas cylinder is expected to arrive on February 11. I have discussed the next steps with Jon and Calvin, and our discussion has been recorded in the experiment log ([link](https://app.box.com/s/hnwy5gf60s6fvmzqfh1szk3uzcyvttu1)).

Since the beam profile is highly sensitive to the angle of the metallic mesh, adjusting the mesh inside the laser system is challenging. Additionally, thermal expansion affects the mesh angle, further complicating alignment. To address these issues, Jon is designing a new setup that positions the mesh outside the laser system. This modification will allow for easier manual adjustments and significantly reduce temperature-induced distortions.

For vacuum sealing, a temporary flat PTFE window will be used due to its low cost. Depending on its thickness, this window will have a transmission rate of 88%–100% for 693 GHz. However, the reflection from this window may lead to FIR energy loss due to suboptimal resonance conditions. If a good beam profile is achieved, Jon plans to upgrade the window to a Brewster window in the future, which would enable nearly 100% transmission.

Currently, I am writing a document detailing the basic structure of the laser system, the alignment method, and the experimental laser results. Once completed, I will share the key findings to facilitate future laser adjustments.

Best regards,

Xinhang