Hi Professor

This week, we finally got a better FIR beam profile compared to previous results

The beam profile is very sensitive to the mesh plane angle, very small change will lead to dramatically deformation. Jon make up a imaging plane in front of reference laser, than we could adjust each mirror based on if the reflected laser is overlap with the launch laser point. but for mesh plane, the center of diffraction spot (zero order diffraction) is too big to do alignment accuracy. So we setup a aperture in front of the FIR output windows to minimize the center of spot, than it would help us to adjust the mesh more accuracy. Beside this, Jon also replace the damage rear mirror with new one, cleaning the cooling tube, setting a more direct mirror setup, enlarging the FIR input window for avoiding any energy loss. My main job is testing the beam profile again and again, realigning the mesh angle and continue check the beam profile.

One important thing is that the CO2 beam profile is independent of the FIR beam profile ,so we don’t need to worry that the CO2 beam pattern would influence the pattern of FIR beam.

Have a good weekend !

Best regards

Xinhang

Hi Professor,

This week, we finally achieved a better FIR beam profile compared to previous results.

The beam profile is very sensitive to the mesh plane angle, as even a very small change can lead to dramatic deformation. Jon set up an imaging plane in front of the reference laser for mirror alignment so that we could adjust each mirror based on whether the reflected laser overlaps with the launch laser point. However, for the mesh plane, the center of the diffraction spot (zero-order diffraction) is too large to achieve precise alignment. To address this, we installed an aperture in front of the FIR output window to minimize the size of the center spot, which makes adjusting the mesh more accurate.

In addition, Jon replaced the damaged rear mirror with a new one, cleaned the cooling tube, set up a more direct mirror arrangement, and enlarged the FIR input window to avoid energy loss. My main tasks included repeatedly testing the beam profile, realigning the mesh angle, and continuously checking the beam profile, It is tedious but very necessary.

One important observation is that the CO2 beam profile is independent of the FIR beam profile, so we don’t need to worry about the CO2 beam pattern affecting the FIR beam pattern.

Have a good weekend!  
Best regards,  
Xinhang