Hi Professor

This week, I tested the repeatability of the laser beam profile, and the results were quite good. I can adjust the beam profile based on the beam intensity. Once I achieved good beam intensity, I consistently obtained a good beam profile. I tried this several times, and it worked well every time. Additionally, the intensity is highly sensitive to the mesh angle—only at the correct angle can I achieve good intensity and the corresponding beam profile.

The new issue is: the FIR power can drop without any changes to the setup. Sometimes, the maximum power (after scanning the cavity and finding the best position) can drop from 25 mV to 8 mV. Additionally, the intensity is sensitive to the platform. Even applying a small force by hand to the optical platform (where all the systems are set) can cause nearly a 25% change in intensity.

From my consideration, since our laser output power is highly dependent on the reflection, and the system's reflection is determined by the mesh, window, and the distance between them. The reflection can change from 88% to 95% during cavity scanning duo to the interference. Therefore, if the cavity resonant position does not match up with the optimal reflection, the system will not produce good output. For instance, a change in reflection from 90% to 83% results in a power drop from 42 mW to 16 mW (from Robert's thesis). This issue should raise our attention, and the detailed calculations are provided in the appendix.

Have a good weekend!

Best regards

Xinhang