Hi Professor

I didn’t do much job recently since too many holiday, I mainly focus on my paper revision and modification, thanks you and our group people’s help ,it is much better compared to its original version !

In order to solve the problem of donut beam profile ,Last week ,Jon take out the rear mirror and found that mirror surface is serious corrosion by formic acid gas, and He send to the company for repairmen .We gauss the rough mirror surface will caused more CO2 laser scattering ,which may lead to the asymmetry of the beam shape and the black hole profile .Yesterday ,we check the optical stage of the rear mirror in the formic acid laser system ,and found the stage was a little higher ,causing the inner rear mirror center off the axis ,so Jon readjust the height of the optical stage ,and set the mirror center on the optical axis .The repaired mirror is supposed to back on next Monday .

Today ,Jon and I will check the focus point of the CO2 laser in the Formic acid laser system ,make sure the focus point is between the window and rear mirror ,that make use the CO2 beam wouldn’t be scraped by the window and inner mirror .

I didn’t much work recently due to the holidays. Instead, I’ve primarily focused on revising and improving my paper. Thanks to your support and the help from our group members, the paper is now significantly improved compared to its original version!

To address the issue of the donut-shaped beam profile, Jon removed the rear mirror last week and discovered that its surface was severely corroded by formic acid gas. He sent it to the manufacturer for repair. We hypothesize that the roughened mirror surface increased CO2 laser scattering, potentially causing the beam asymmetry and the black hole profile observed.

Yesterday, we inspected the optical stage of the rear mirror in the formic acid laser system and found that the stage was slightly elevated. This caused the center of the rear mirror to be misaligned with the optical axis. Jon readjusted the height of the optical stage and aligned the mirror center with the optical axis. The repaired mirror is expected to return next Monday.

Today, Jon and I plan to verify the focus point of the CO2 laser in the formic acid laser system. We aim to ensure that the focus point is located between the window and the rear mirror to prevent the CO2 beam from being obstructed by the window or the internal mirror.