

Trajectories With & Without Downstream Quad

The effects of the quadrupole downstream of the plasma have been investigated as a function of plasma density. Distances are in Figure 1 below. When there is no plasma, the Sinelike trajectory starting at the upstream OTR will be at a positive position at the integrated Cherenkov when the quadrupole is off and at a negative position when the quadrupole is on. This is because the quadrupole produces an image of the upstream OTR 5.1 m downstream of the quadrupole, which is before the integrated Cherenkov.

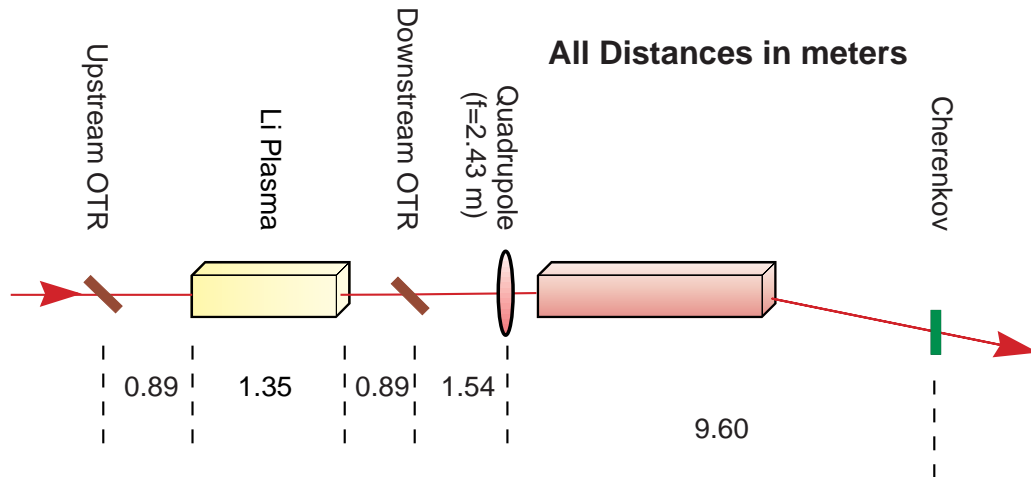


Figure 1: E-157 layout with distances.

How does this behavior extrapolate to large plasma density? The principle trajectories are plotted below. While the quadrupole causes a sign change in the principle trajectories at low plasma density, they are approximately in phase at high density. The effect of the quadrupole at high plasma density is to reduce the magnitude of the trajectories. In summary, the size of any betatron tail is reduced but not its location.

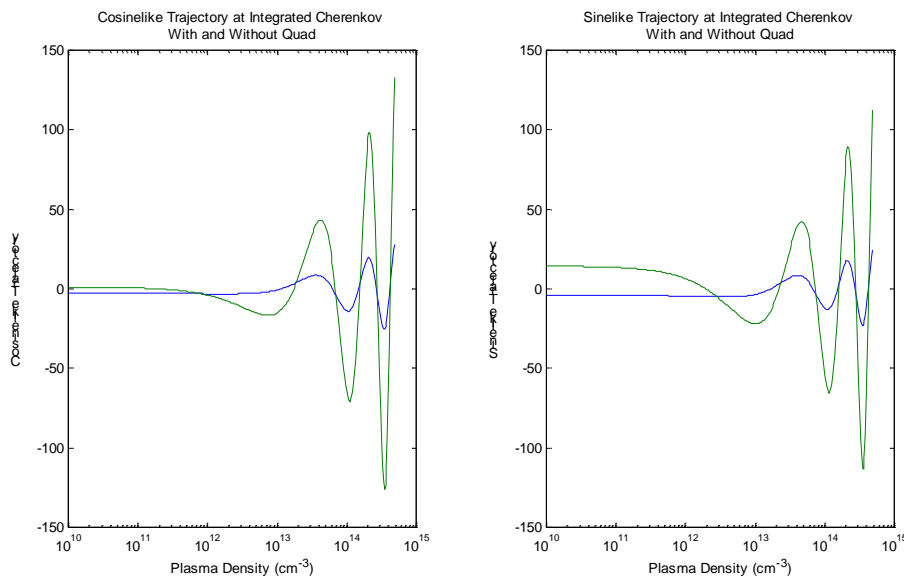


Figure 2: C and S at the Integrated Cherenkov