The information from the laser pulses is as follows:

Pre-ionizing pulse: Wavelength = 266 nm, WFHM = 10ns, f=300mm, The theoretical beam waist at the initial time is $\omega_0 = 22.062\mu m$. Rayleigh Range = $\frac{\pi\omega_0^2}{\lambda_{266}}$

Second pulse: Wavelength = 1064 nm, WFHM = 13ns, f=300mm, $t_0 = 10$. The beam waist at the initial time is $\omega_0 = 22.015\mu m$. Rayleigh Range = $\frac{\pi\omega_0^2}{\lambda_{1064}}$

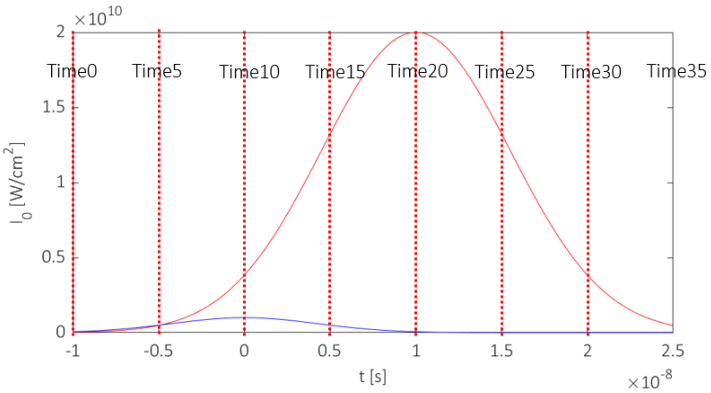


Figure 1 (ignore the intensity values on the y axis they are from the previous set of results -V1) figure is here to show pulse locations in time and output file naming convention

There is a delay of 10ns between peak intensities of the first and second pulses. The gas density is 1.174[kg/m^3] with an initial composition of 80% nitrogen and 20% oxygen. The initial electron number density is assumed to be 1e8(#cm^-3) with 80% coming from nitrogen molecules and 20% coming from oxygen.

The data is presented as follows:

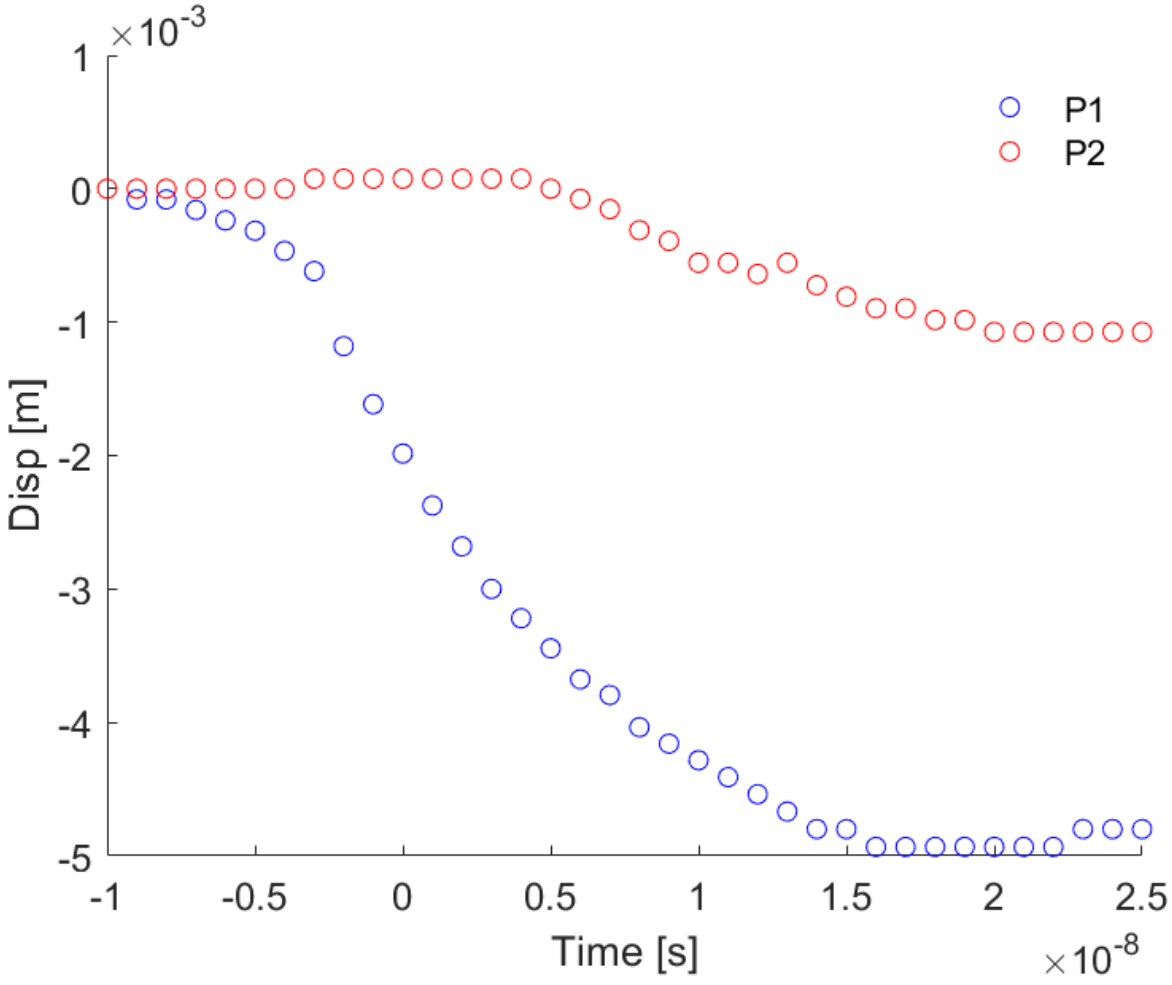
There are ***47*** Radial profiles of electron density and intensity of the second pulse spanning +-15*(Rayleigh Range) have been extracted and presented in the corresponding CSV files. Each file corresponds to a timestep (Time0 = -10ns, time5 = -5ns etc as shown in the diagram above),

- The first row of the file is the normalized z location of the cross-section data (Z/Rayleigh Range of the second pulse)
- The first column is the radial position (R/omega0 of the second pulse) of the data in cols 2 – 47 etc
- The data for intensity and electron density is shown in the subsequent columns (one file for each data set)

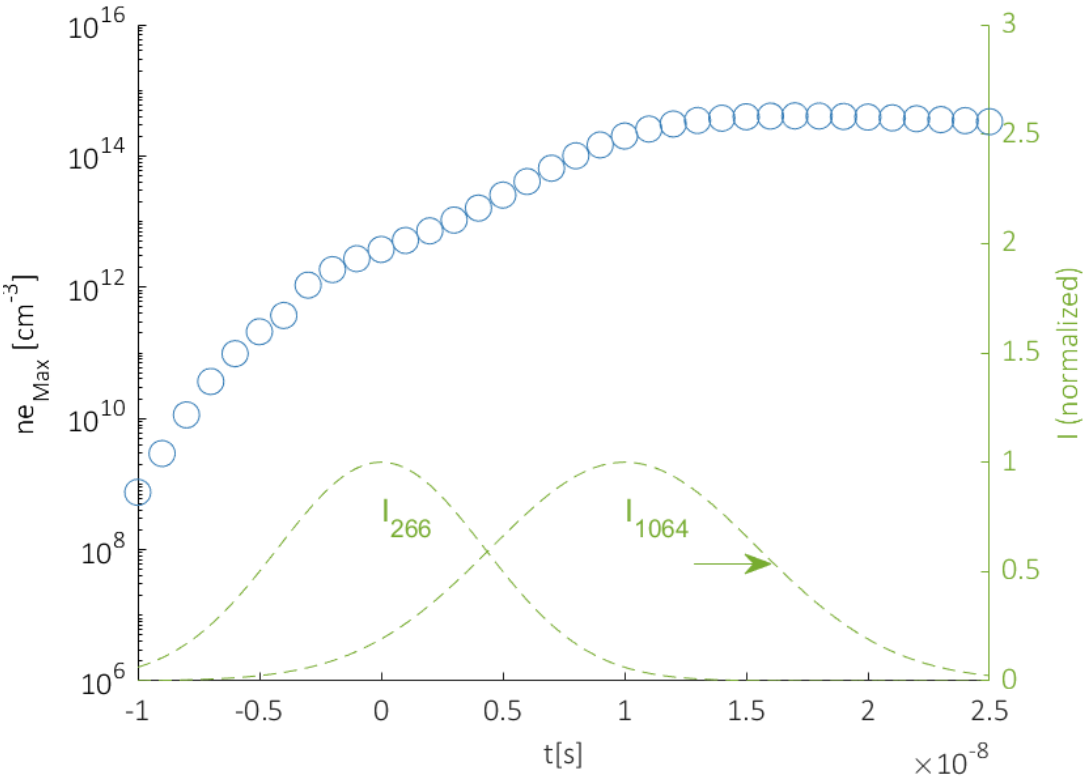
R/omega0	Z/RayleighRange				
	Each Col is a data set	Each Col is a data set	Each Col is a data set	Each Col is a data set	Each Col is a data set

Simulation parameters are chosen to match the experiment completed in Wilvert et. al, 51st AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition. 2013 and Yalin et al. Physics of Plasmas 21.10 (2014): 103511.

The displacement of the peak intensity over time is shown below.



The evolution of the peak electron density is as follows:


10^{16}
10^{14}
10^{12}
10^{10}
10^{8}
10^{6}
ne_{Max} [cm^{-3}]
3
2.5
2
1.5
1
0.5
0
I (normalized)
I_{266}
I_{1064}
-1
-0.5
0
0.5
1
1.5
2
2.5
t[s]
$\times 10^{-8}$