Goal:

Measure the uv profiles along the actual oven location, and evaluate the uv fluence over an area comparable to $c / \omega_{\mathrm{p}}$.

Procedure:

At each z location 3 images where taken: 1) an image of the HeNe laser beam onto which the uv has been aligned "by eye", as in the real experiment, 2 ) an image of the uv beam at that location, 3) a background image with the uv laser off. The location of the HeNe beam is determined in each case, and it is assumed that the particle beam would be traveling down the plasma at this location. For each uv beam image the corresponding background image is subtracted. The total uv energy is obtained from the sum of the all the counts in the image. The local fluence is obtained from the sum of the image counts in $\mathrm{a} \approx 1.8 \mathrm{~mm}^{2}$ around the HeNe beam location. The local fluence to total uv energy is shown on the two following figures, for the case of the uv beam centered on the pellicle (data before some date in the run to be determined), and the case of the uv beam off centered on the pellicle (data after some date in the run to be determined). For each uv image a FWHM both in $x$ and $y$ was calculated to obtain the FWHM spotsize

## Results:

- The actual profiles along the oven are different from the ones taken on the side of the oven with a different way of clipping the uv beam.
- The local fluence to total uv energy is different in the case of the beam centered than in the case of the beam not centered on the pellicle.
- The uv beam was "aligned by eye" on the HeNe beam. The images show that the alignment is good in general, however the HeNe (particle) beam does not follow the peak of the uv beam energy.
- The FWHM areas decrease by about $30 \%$ along the oven (the FWHM fluences thus increase by the same amount), whereas the local fluences increase by factors of more than 3 along the oven.


## Conclusions:

- The actual profiles along the oven need to be measured and optimized if there is any clipping of the uv beam.
- The local fluence needs to be measured along the oven, rather than the FWHM fluence (or any kind of average fluence).
- Good luck to fold these in the plasma density measurements. That's all for now!

Relative HeNe beam (particle) location every 20 cm along the oven, uv centered on the pellicle


UV beam profile every 20 cm along the oven, uv centered on the pellicle


Histogram of the UV beam images, 50 pixels by 50 pixels in the upper left corner of the previous series of images


Relative HeNe beam (particle) location every 20 cm along the oven, uv off-centered on

the pellicle

UV beam profile every 20 cm along the oven, uv off-centered on the pellicle


Histogram of the UV beam images, 50 pixels by 50 pixels in the upper left corner of the previous Seri of images


Ratio of the total energy in the beam (sum of the image counts after background subtraction) to the energy in a $1.8 \mathrm{~mm}^{2}$ at the HeNe location, for the centered pellicle case.


Ratio of the total energy in the beam (sum of the image counts after background subtraction) to the energy in a $1.8 \mathrm{~mm}^{2}$ at the HeNe location, for the off-centered pellicle case.


Beam area as obtained from the FWHM of the images (summed along $x$ or y), for the centered and off centered case. The fluence at each location is proportional to one over the area (as calculated for the previous run cases).


