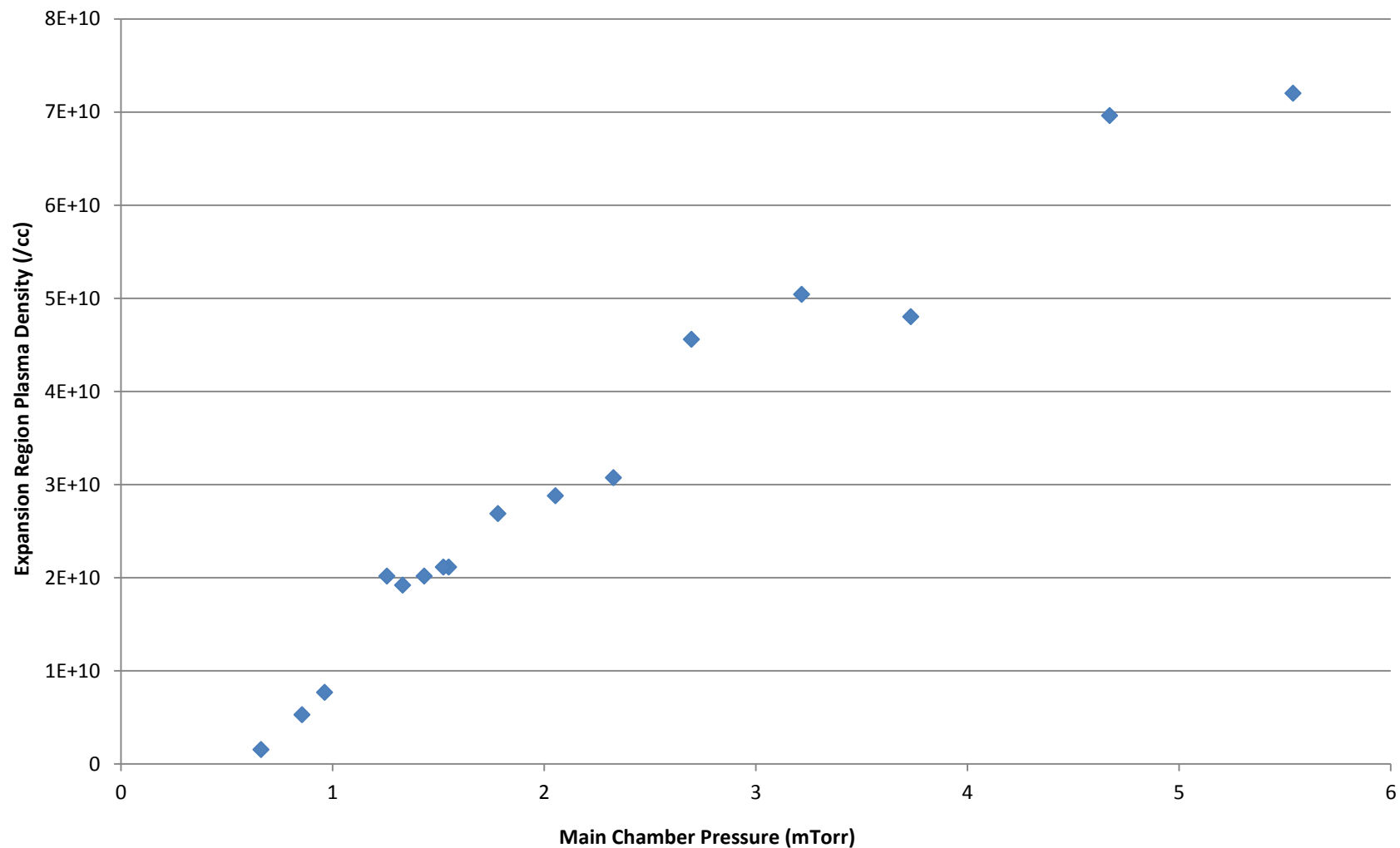


Plasma Density

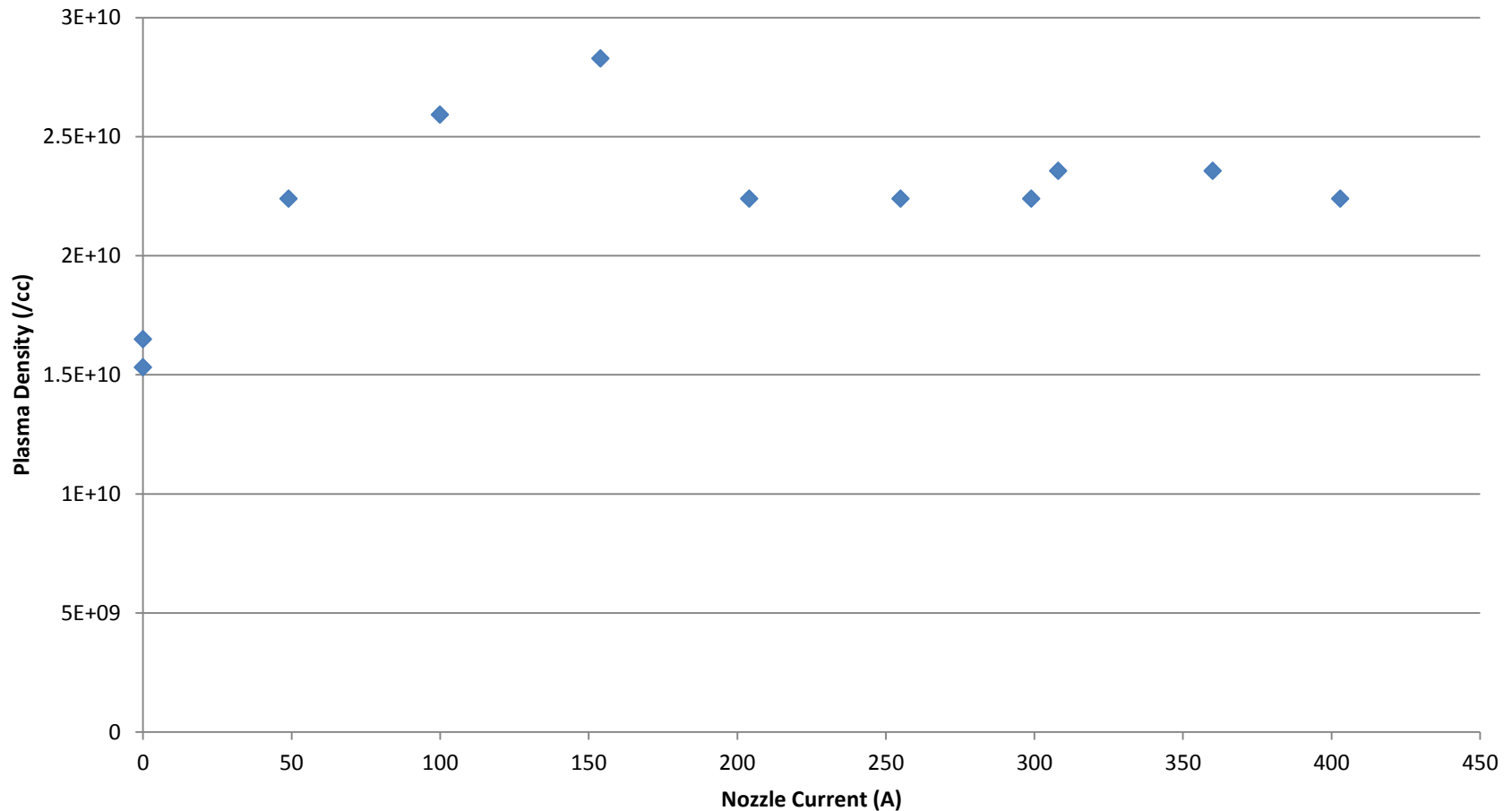
Charles Swanson presentation to PFRC group
Monday, August 31, 2015

Hydrogen Plasma Density vs MC Pressure (300W)



Plasma density in ER measured by interferometer

Plasma Density in ER vs Nozzle Current



Pnet=300W, Pmc=1.7mTorr

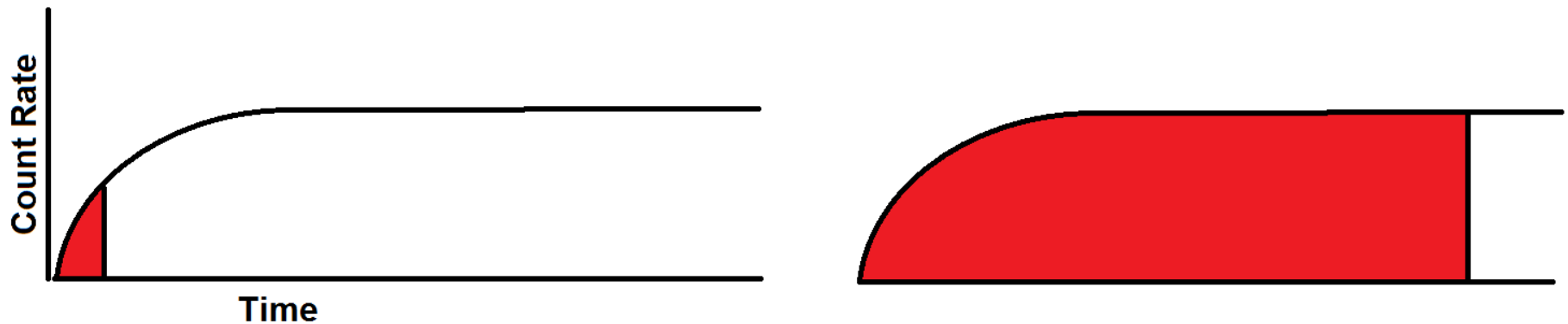
SR Probe Stories: How Many Fast Electrons ARE There?

- Hutchinson: $I = eA_p \left(n_b \sqrt{\frac{2T_b}{\pi m_e}} \exp\left(\frac{eV}{T_b}\right) + n_h \sqrt{\frac{2T_h}{\pi m_e}} \exp\left(\frac{eV}{T_h}\right) - (n_h + n_b) \sqrt{\frac{T_b}{m_i}} \frac{A_s}{A_p} \exp\left(-\frac{1}{2}\right) \right)$
- Floating potential: $I = 0$, measured to be $\sim 270V$
- Assuming $T_b \sim 300 - 1000 eV$, $\frac{n_h}{n_b} \sim 0.002 - 0.007$
- (When floating potential in MC is measured to be 1kV, it's more like 0.5% to 8%)

Things Measured vs Modulation

Frequency: What will we get?

- Switching time of RF switch is 100ns. We can modulate from DC to 10MHz.
- Count Rate vs Modulation Frequency:



Spectrum vs modulation frequency gets similar time-dependence.