Virginia ^{3}He Target Lab Status

Al Tobias
Vladimir Nelyubin
Jaideep Singh
University of Virginia

Collaboration Meeting
October 21, 2005
Jefferson Lab, Newport News, VA

Outline

- G_E^n Cell Inventory and Performace at 30W
- G_E^n Standard Cell Performance at 50W
- Cell Characterization and R&D
- Conclusions and Implications

LARGE/Standard G_E^n Cell Inventory

the four acceptable cells in red

Cell	Pol. (P_{30W})	Spinup (235^oC)	Spindown (25^oC)	Density (ρ)	Pressure (255^oC)
Panache*	43%*	6hr*	50/35hr	8.0amg	14.0atm
Anna	39%	7hr	N.A.	8.0amg	14.0atm
Barbara	43%	6hr	N.A.	7.6amg	13.2atm
Dolly	42%	7hr	32hr	7.4amg	12.5atm
Gloria	N.A.	N.A.	N.A.	7.1amg	12.3atm
AL ttc	45%	8hr	26hr	8.9amg	13.6atm
Dexter	46%	8hr	18hr	9.9amg	15.1atm

* done with traditional 6 beam laser system

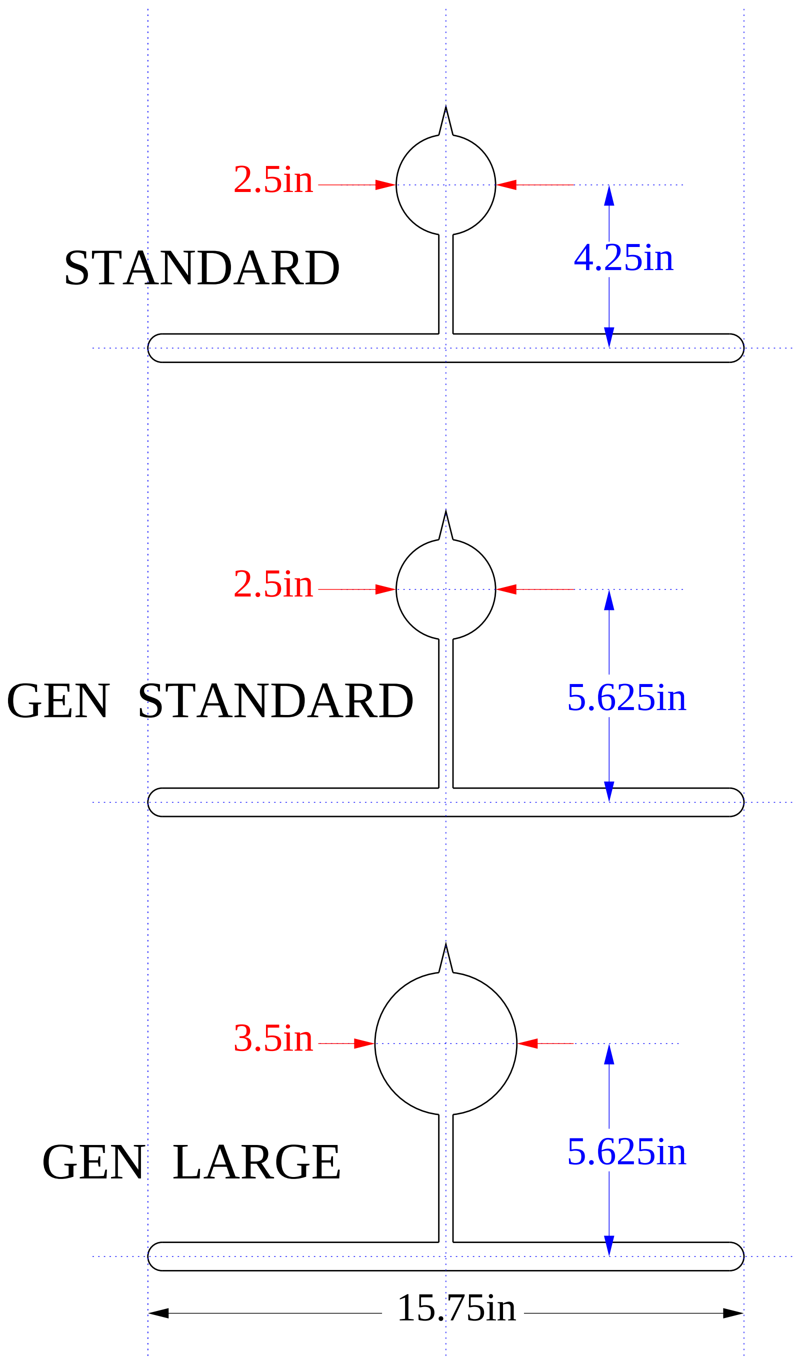
Power Density @ 30W: LPC = $0.75 W/cm^2$, SPC = $1.20 W/cm^2$

Standard G_E^n Cell Performace @ 50W

acceptable cell in red

Cell	Pol. (235^{o}C)	Spinup (235^{o}C)	Spindown (25^{o}C)	Density (ρ)	Pressure (255^{o}C)
AL ttc	53%	8hr	26hr	8.9amg	13.6atm
Dexter	52%	8hr	18hr	9.9amg	15.1atm

Power Density @ 50W: LPC = 1.25W/cm^2, SPC = 2.00W/cm^2


2.5in
4.25in
STANDARD
2.5in
5.625in
GEN STANDARD
3.5in
5.625in
GEN LARGE
15.75in

Cell Characterization

- Buoyancy Volume - done after fill, has been done for every cell and is under control
- Wall/Window Thickness - not yet done, need to know importance to G_E^n , need training
- Pressure Broadening - new larger oven complete, new wrinkle due to K absorption tail, need some thought and training

Cell R&D

- K/Rb Density Ratio Measurements
- K&Rb Polarization Measurements

Conclusions

- Much Less Laser Power for Same Performance - implication: more laser power can improve performace
- Much Faster SpinUp Time Constant 4-8hrs (compared to 10-20hrs) - implication: less sensitive to electron beam depolarization
- Reduced Statistical Variation in Cell Quality - as gauged by polarization, implication: every cell we successfully fill/pull-off will be acceptable
- Cells Made in Different Labs Produce Consistent Results - glass blown from different glassblowers filled with the same nominal hybrid mix

We probably have some repeatable control of the hybrid mix which makes us optimistic that we can optimize the ratio. More real data coming soon ...