

MPTS Update Early 2008

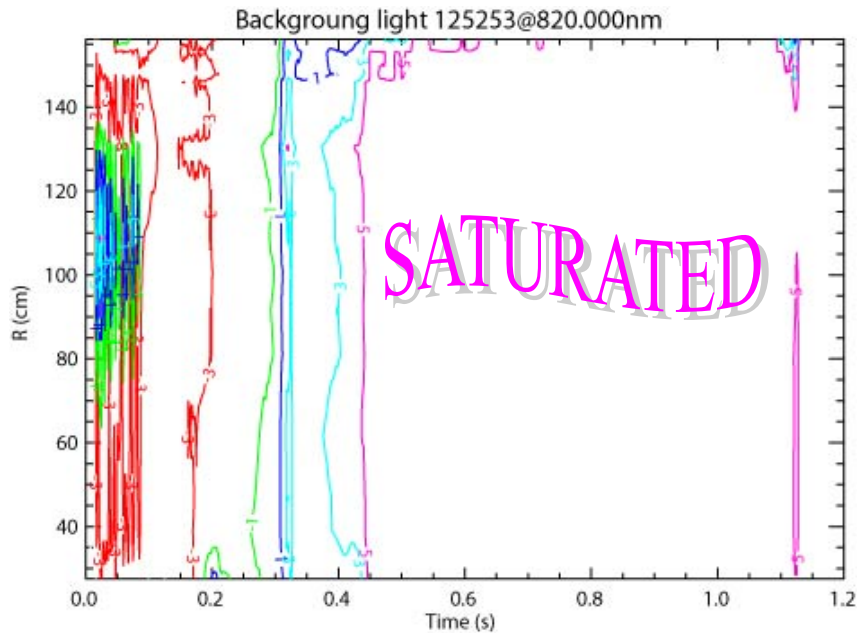
Benoît LeBlanc

NSTX Monday Meeting

25-Feb-2008

MPTS Operation Challenges in 2007

Strong background radiation,
possibly caused my metals



Contour plot of raw data for filter 820-nm and shot 125253

Usual strong window coating,
part of window with 55% transmission



Photograph of the MPTS viewing
window after the end of the 2007 run
campaign

MPTS Upgrades

Polarizer and in-situ window Calibration



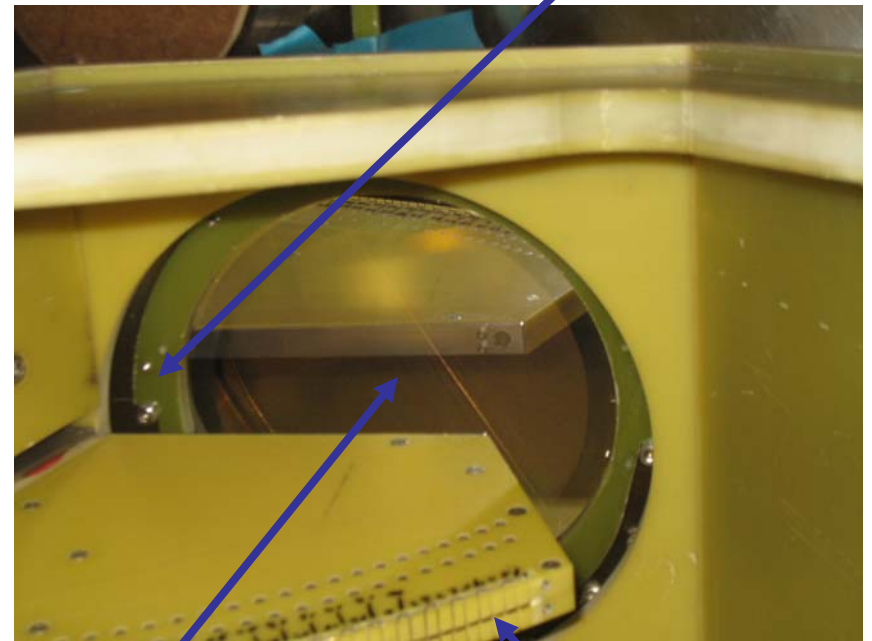
- A polarizer has been installed on the viewing optics in order to reduce plasma radiation
 - Metallic accumulation, observed during last experimental campaign, generated high plasma radiation often saturating the MPTS detection system
- An in-situ retractable viewing optics illumination system has been installed for spectrally resolved measurement of the window transmission under vacuum condition
 - Window coating was unusually large last year with part of the optics losing around 45% transmission

Polarizer Installed on Viewing Optics

- Extinction ratio 500/1
- Nominal transmission for vertically polarized light about 90%
- Polarizer in place since beginning of 2008 run

G. Labik

Polarizer in frame assembly



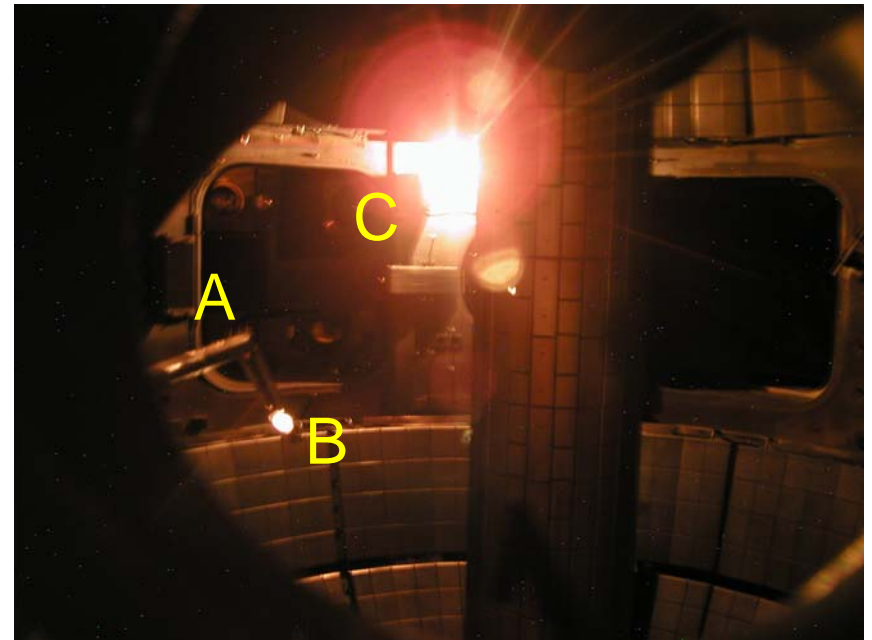
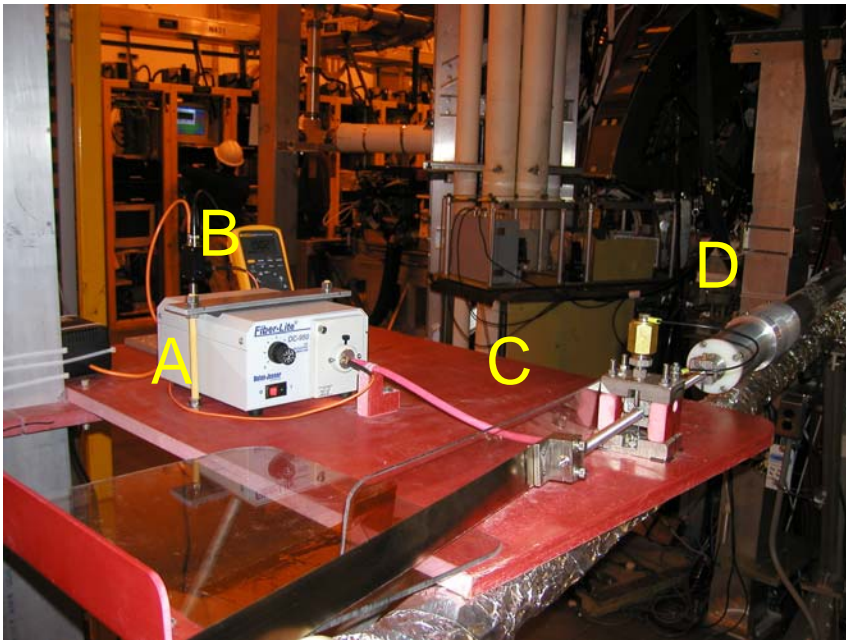
Window & closed
shutters

Fiber bundle holder

In-situ Illumination Probe

External hardware: (A) light source; (B) light monitor; (C) fiber optics; (D) probe insertion assembly

Internal hardware: (A) insertion shaft; (B) illumination screen; (C) filament normally off



C. Priniski, J. Desandro

In-situ illumination probe in operation since beginning of the 2008 run

New Challenge for 2008

- Even with viewing-optics polarizer in place, observe localized saturation
- Affects radii between $R=116$ cm and 135 cm
- Source of “offending” background light located at bay J

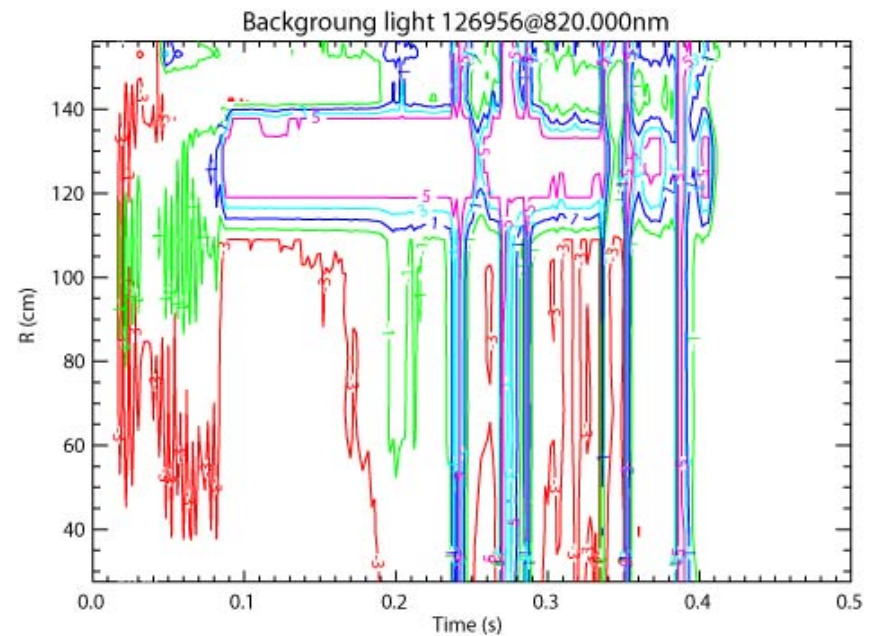
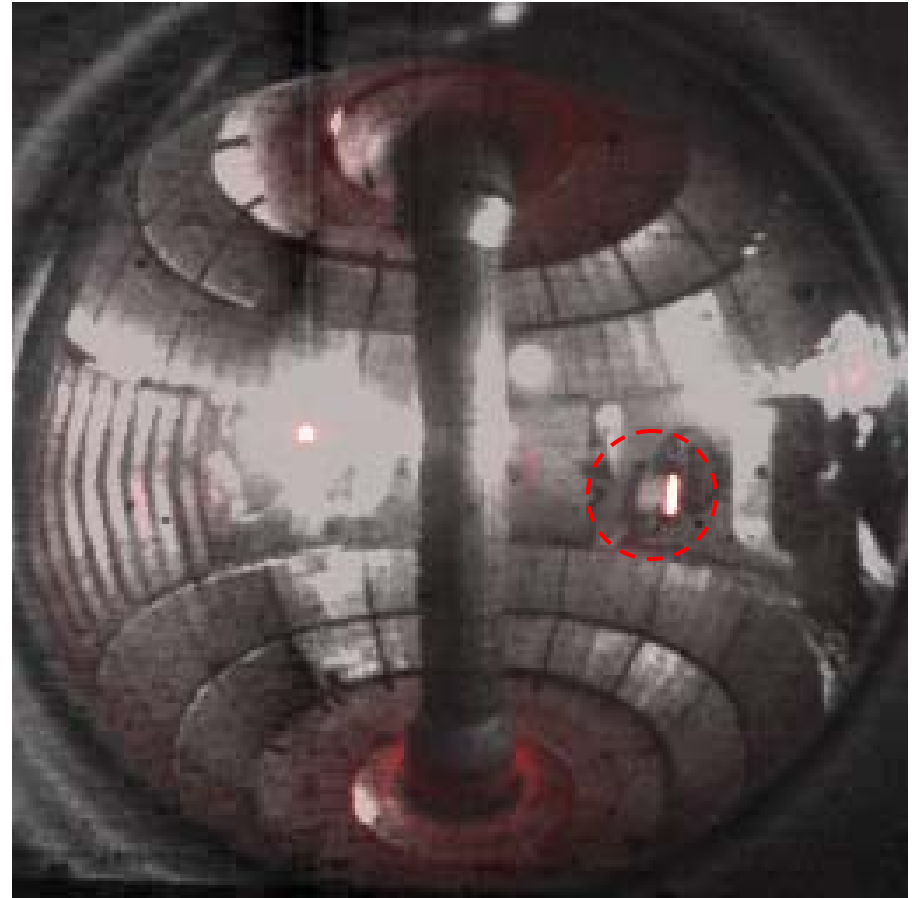


Image Analysis Reveals Plasma Contact with sFLIP

- Digital overlay of vacuum vessel background image, with near-infrared filtered image of 127062
- Interaction of plasma with “ion side” of sFLIP detector is visible
- Radiation impedes TS measurements over $R=116-135\text{cm}$



R, Maqueda

Conclusion

- Polarizer installed on MPTS viewing optics
 - Should normally deal with saturation problems observed in 2007
 - But new(?) plasma interaction with sFLIP generates localized background radiation, sufficient to saturate a subset of MPTS radial channels ($R=116-135\text{cm}$)
- In-situ illumination probe in place
 - Data acquisition started before beginning of 2008 run

Strong Window Coating Observed

Area Exposed during High Power Most Affected



- Two shutters protect the viewing window
 - S217 is always open during plasma operation
 - S218 is shut during high power discharge
- Coating occurred mostly in the S217 area
 - Coating appears consistent with plasma operation rather than Liter evaporation

