Princeton Plasma Physics Laboratory

NSTX Machine Proposal

Title: **Helium shots for initial operation of SWIFT camera**

OP-XMP-56	Revision**: 0**	Effective Date: **June 17, 2008** *(Ref. OP-AD-97)* Expiration Date: *(2 yrs. unless otherwise stipulated)*

Procedure Approvals

Responsible author:	Date
ATI (NSTX Physics Ops):	Date
RLM (NSTX Expt. Research Ops):	Date

Responsible Division: **Experimental Research Operations**

Procedure Requirements

designated by RLM

	NSTX Work Permit		T-MOD (OP-AD-03)
	Independent Review		ES&H Review

MINOR MODIFICATIONS

REVIEWERS (designated by RLM)		
Organization/Position	Name	Signature
ATI		
Test Director		
Independent Reviewer		
NB		
RF		
Diagnostics		

TRAINING (designated by RLM)

Training required: No ■ Yes ☐ Instructor _____

Personnel (group, job title or individual name)	Read Only	Instruction	Hands-On

Training Rep. _____

RLM _____

NSTX MACHINE PROPOSAL

TITLE: **Helium shots for initial operation of SWIFT camera** No. **OP-XMP-56**
AUTHORS: **S.F Paul, Nobuhiro Nishino, L. Roquemore** DATE: **June 16, 2008**

1. Overview:

This proposal will provide a series of helium NBI heated plasmas for shakedown of the SWIFT diagnostic. Discharges will single null diverted and center stack limited. This requirements are moderately high helium density to insure adequate brightness for the camera.

2. Theoretical/ empirical justification

This diagnostic relies on measuring He II emission. Transient He gas-puffing has not been adequate to for this diagnostic.

3. Experimental run plan

Use shot #129141 from May 2008, (a 1 MA, 5.5 kG, helium discharge) as the reference. If that is troublesome, use shots 125133 or 125134 (600 kA) as backups. Inject Source A at 80 msec, Add source B Source B at 210 msec and optionally Source C at 280 msec. Take several shots adjusting density ramp-up for relatively quiet discharges. If time permits repeat for center-stack limited discharges.

4. Required machine, NBI, RF, CHI and diagnostic capabilities

We will be running Helium plasmas at moderately high density to insure adequate emission for taking data with the SWIFT camera.. Helium should exhibit better density control important to avoid the β limit. These plasmas should not dither into H-mode. However, a clean transition into H-mode while maintaining the improved core confinement would be very useful. No RF or CHI is necessary.

5. Sign off at run time:

5.1 Permission to Proceed: _____

Physics Operations Head

5.2 Documentation of results:

Documentation of the results completed, attached to proposal and sent to Ops. Center with copies to Cognizant Physicist and Head of Physics Operations.

_____

Cognizant Physicist/Test Director

PHYSICS OPERATIONS REQUEST

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Machine conditions (specify ranges as appropriate)

I_{TF} (kA): 5.5 kG Flattop start/stop (s):

I_P (MA): 1 MA Flattop start/stop (s): 0.13

Configuration **LSN and perhaps Limiter**

Outer gap (m): Inner gap (m):

Elongation κ: Upper/lower triangularity δ:

Z position (m):

Gas Species: **Helium** Injector(s):

NBI Species: **D** Sources: **A,B,C** Voltage (kV): **90 kV** Duration (s):

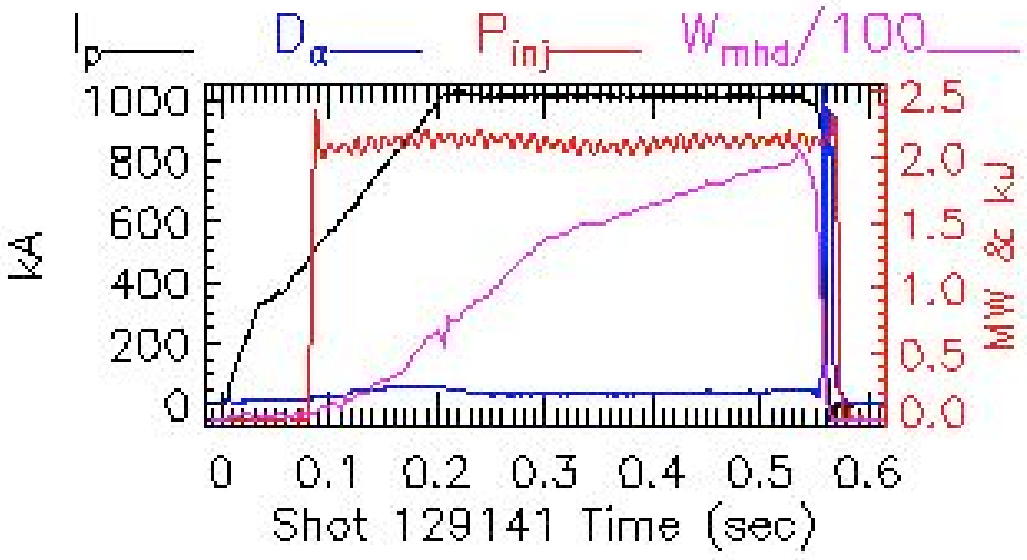
ICRF Power (MW): **Off** Phasing: Duration (s):

CHI: **Off** Bank capacitance (mF):

LITER: Off

Either: List previous shot numbers for setup: 129141 and possibly 125133 and 125134

Or: Sketch the desired time profiles, including inner and outer gaps, κ, δ, heating, fuelling, etc. as appropriate. Accurately label the sketch with times and values.



DIAGNOSTIC CHECKLIST

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Note special diagnostic requirements in Sec. 4

Diagnostic	Need	Want
Bolometer – tangential array	√	
Bolometer – divertor		
CHERS – toroidal	√	
CHERS – poloidal	√	
Divertor fast camera		
Dust detector		
EBW radiometers		
Edge deposition monitors		
Edge neutral density diag.	√	
Edge pressure gauges		
Edge rotation diagnostic		
Fast ion D_alpha - FIDA		
Fast lost ion probes - IFLIP		
Fast lost ion probes - SFLIP		
Filterscopes		
FIReTIP		
Gas puff imaging		
Hα camera - 1D		
High-k scattering		
Infrared cameras		
Interferometer - 1 mm		
Langmuir probes – divertor		
Langmuir probes – BEaP		
Langmuir probes – RF ant.		
Magnetics – Diamagnetism	√	
Magnetics – Flux loops	√	
Magnetics – Locked modes		
Magnetics – Pickup coils	√	
Magnetics – Rogowski coils	√	
Magnetics – Halo currents		
Magnetics – RWM sensors		
Mirnov coils – high f.		
Mirnov coils – poloidal array		
Mirnov coils – toroidal array	√	
Mirnov coils – 3-axis proto.		

Note special diagnostic requirements in Sec. 4

Diagnostic	Need	Want
MSE		
NPA – ExB scanning		
NPA – solid state		
Neutron measurements		
Plasma TV	√	
Reciprocating probe		
Reflectometer – 65GHz		
Reflectometer – correlation		
Reflectometer – FM/CW		
Reflectometer – fixed f		
Reflectometer – SOL		
RF edge probes		
Spectrometer – SPRED		
Spectrometer – VIPS		
SWIFT – 2D flow	√	
Thomson scattering	√	
Ultrasoft X-ray arrays		
Ultrasoft X-rays – bicolor		
Ultrasoft X-rays – TG spectr.		
Visible bremsstrahlung det.		
X-ray crystal spectrom. - H		
X-ray crystal spectrom. - V		
X-ray fast pinhole camera		
X-ray spectrometer - XEUS		