

**Princeton Plasma Physics Laboratory
NSTX Machine Proposal**

Title: Raman Scattering Calibration of the MPTS System with Applied Magnetic Fields

OP-XMP-61	Revision: 0	Effective Date: <i>(Ref. OP-AD-97)</i> Expiration Date: <i>(2 yrs. unless otherwise stipulated)</i>
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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)		
<u>Organization/Position</u>	<u>Name</u>	<u>Signature</u>
Test director	B. LeBlanc	

TRAINING (designated by RLM)			
Training required: No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Instructor _____			
Personnel (group, job title or individual name)	Read Only	Instruction	Hands-On
Training Rep. _____			

RLM _____

NSTX MACHINE PROPOSAL

TITLE: Raman Scattering Calibration of the MPTS System with Applied Magnetic Fields	No. OP-XMP-61
AUTHORS: B. LeBlanc, M. Bell	DATE: July 11, 2008

1. Overview:

During the standard calibration of the MPTS system using Raman scattering from nitrogen gas in the vacuum vessel, magnetic fields will be applied on some shots from the TF and PF5 coils separately to investigate the effect of the molecular rotational states on the observed spectra.

2. Justification:

This will provide confirmation that the calibration technique is well understood, and additional scientific insight.

3. Plan:

During the sequence of computer clock cycles when Raman scattering data is being acquired, energize on separate shots the TF coil to a current of at least 25kA (absolute value, with normal sign) and the PF5 coil to a current of 10kA with a flattop duration of 0.5s (or longer if possible). Lower current shots may be requested if a clear effect is observed.

TF shots: _____

Shot numbers (current levels, kA)

PF5 shots: _____

Shot numbers (current levels, kA)

4. Required machine, beam, ICRF and diagnostic capabilities:

NSTX and its subsystems must be set up for the standard Raman scattering calibration.

The TF and PF5 coil systems and power supplies must be configured and ready for operation.

5. Sign off at run time:

5.1 Permission to Proceed: _____

Head, Experimental Research Operations or Project Director

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): **-25** Flattop start/stop (s): **≥0.5s duration**

I_{PF5} (kA): **10** Flattop start/stop (s): **≥0.5s duration**

I_p (MA): **n/a**

Configuration: **n/a**

Outer gap (m): **n/a** Inner gap (m): **n/a**

Elongation κ : **n/a** Upper/lower triangularity δ : **n/a**

Z position (m): **n/a**

Gas Species: **N₂ ~100 Torr** Injector(s):

NBI n/a

ICRF n/a

CHI: n/a

LITER: n/a

Previous shot numbers for setup: **TF and PF5 waveforms from a typical “daily 1st test shot”, e.g. 130590, would be suitable.**

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		
H α 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		