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National Synchrotron Light Source II, Brookhaven National Laboratory			
Doc No. PS-C-XFD-PRC-065	Author: M. Benmerrouche	Effective Date: 21Jun2016	Version 1
Title: Beamline ISR (04-ID) Radiation Survey Plan			

Approved by:

6/20/2016

6/20/2016

X 

Mo Benmerrouche
Physicist - Radiation Safety
Signed by: Benmerrouche, Mohamed

X Christie Nelson

Christie Nelson
ISR Lead Beamline Scientist
Signed by: Nelson, Christie

6/20/2016

6/20/2016

X John Aloï

John Aloï
Facility Support Representative
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Robert Lee
ESH Manager
Signed by: Lee, Robert J

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VERSION HISTORY LOG

VERSION	DESCRIPTION	DATE
1	First Issue.	21Jun2016

ACRONYMS

BTS	Booster to Storage Ring	mrem/hr	Millirem per hour
DCM	Double Crystal Monochromator	NSLS-II	National Synchrotron Light Source II
DHRM	Double Harmonic Rejection Mirror	PBS	Pink Beam Stop
ESH	Environment, Safety and Health	PSD	Photon Science Division
FE	Front End	PSH	Photon Shutter
FOE	First Optical Enclosure	RCT	Radiological Control Technician
GB	Gas Bremsstrahlung	SAF	Safety Approval Form
HFM	Horizontal Focusing Mirror	SBMS	Standards Based Management System
ID	Insertion Device	SOE	Second Optical Enclosure
ISR	In-situ and Resonant X-ray Studies	SSA	Secondary Source Aperture
IVU	In-vacuum Undulator	VFM	Vertical Focusing Mirror
LOTO	Lockout/Tagout	WBS	White Beam Stop
mrad	Millirad		

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Beamline ISR (04-ID, IVU 23)

Comprehensive Commissioning Radiation Survey Plan

Date: _____

Before Survey Begins:

- Authorization/approval from the NSLS-II Director to initiate commissioning of the beamline has been received.
- A Beamline System Readiness Checklist has been completed in accordance with PS-C-XFD-PRC-003, *Enabling Beamlines for Operations*.
- The area(s) around the beamline are posted in accordance with SBMS Program Description: *Radiological Control Manual*.
- All shutters closed.
- Front end slits wide open (near maximum extent range).
Note: If FE slits cannot be wide open, record the FE slits parameter here: _____
- ID gap closed to minimum gap after first step of GB radiation survey.
Note: If ID cannot be closed to minimum gap, record the gap value here: _____
- All beamline slits fully open.
- Monochromator Bragg angle moved to the lower limit (~0 degree)
- All mirrors retracted out from beam.

During Survey:

- Authorized Beamline Staff ensure that photon beam is where it should be using the appropriate diagnostic tools.
- Authorized Beamline Staff ensure that the FE Shutter remains open.
- If at any point during performance of this plan a radiation dose rate of 5 mrem/hr or higher is identified, the radiation survey shall be terminated and the cause investigated, and any hazards shall be mitigated before continuing.
- The step sequences of this procedure can be changed.
- This document, with the filled information from the measurements, will act as the "beamline radiation survey interim report," which shall be submitted to the PSD Director and the ESH Manager for review after the survey.
- Minor deviations from the procedure are allowed in the field; however the discrepancy shall be documented in this procedure and submitted to the PSD Director and the ESH Manager for review after the survey.
- During surveys performed in top-off mode, top-off will be adjusted for more frequent injections to keep the stored beam current within the allowable specifications.

Warning: Execution of this Comprehensive Commissioning Radiation Survey Plan, along with the evaluation of the data collected, may only be used as a basis by the PSD Director and the ESH Manager to approve commissioning activities at an electron beam current of up to 3 times the electron beam current measured during this survey. Approval of commissioning of the beamline at a higher electron beam current requires re-execution of this Comprehensive Commissioning Radiation Survey Plan.

Initial Settings:

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Electron Beam Current: _____ Injection Rate: _____ BTS Injection Efficiency: _____

ID gap: _____ Straight Section Vacuum Condition: _____

HFM settings: _____

DCM settings: _____

VFM settings: _____

DHRM settings: _____

Survey start date and time: _____

Authorized Beamline Staff & Radiological Control Technicians (RCTs):

Additional information if available: _____

The following scenarios are covered:

- I. **04 ID-A (FOE) integrity:** Beam on WBS, HFM, PBS, DCM, monochromatic beam on VFM and PSH.
- II. **04 ID-B (SOE) and C/D integrity:** Monochromatic beam on Photon shutter, DHRM, beam stops, and target(s) (Al or Si).

Note: The transport pipe integrity check is included in this survey plan.

Survey Conditions:

HOLD POINT: Evaluate and ensure that all applicable controls listed in the Commissioning SAF are in place, including LOTO requirements for the beamline photon shutters (in accordance with PS-C-XFD-PRC-024, *Beamline Photon Shutter Centrally Controlled Lockout/Tagout Procedure*).

HOLD POINT: Before opening safety shutters in the front end, survey the upstream wall of the FOE to make sure no radiation comes through.

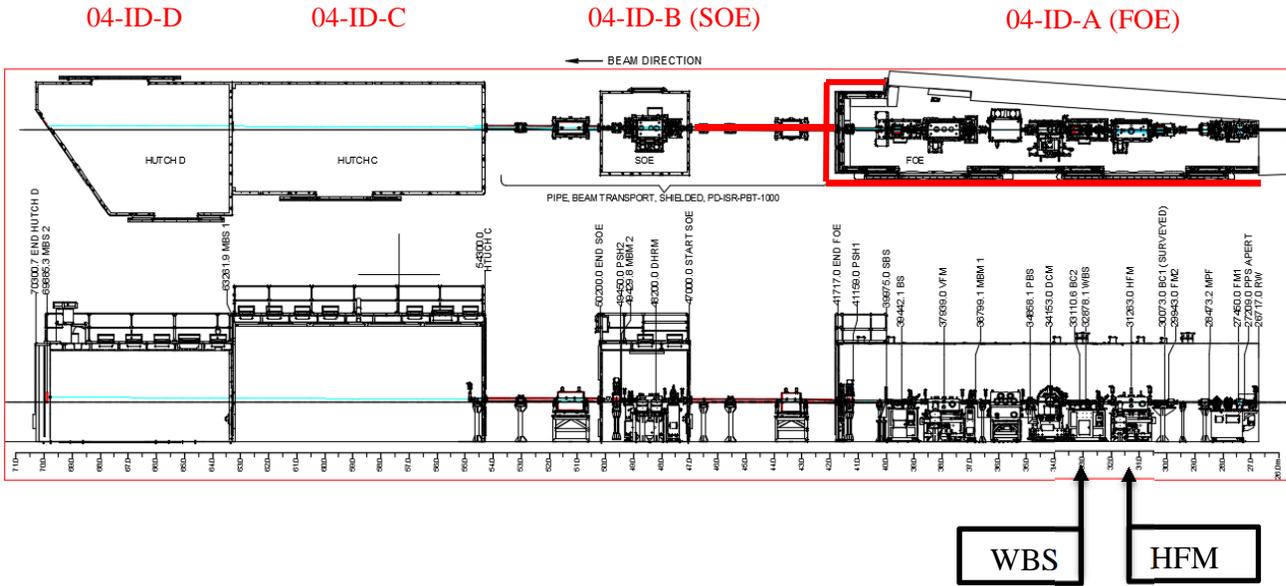
Note: Detailed diagrams of hutch A and B are included in Attachment A.

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I. Check the integrity of FOE (04-ID-A), transport pipe, and Photon Shutter 1.

- GB radiation survey: Gap open, FE slits wide open, GB on WBS, survey all walls and roof of the FOE (04-ID-A), and downstream pipe behind the downstream wall of FOE.**



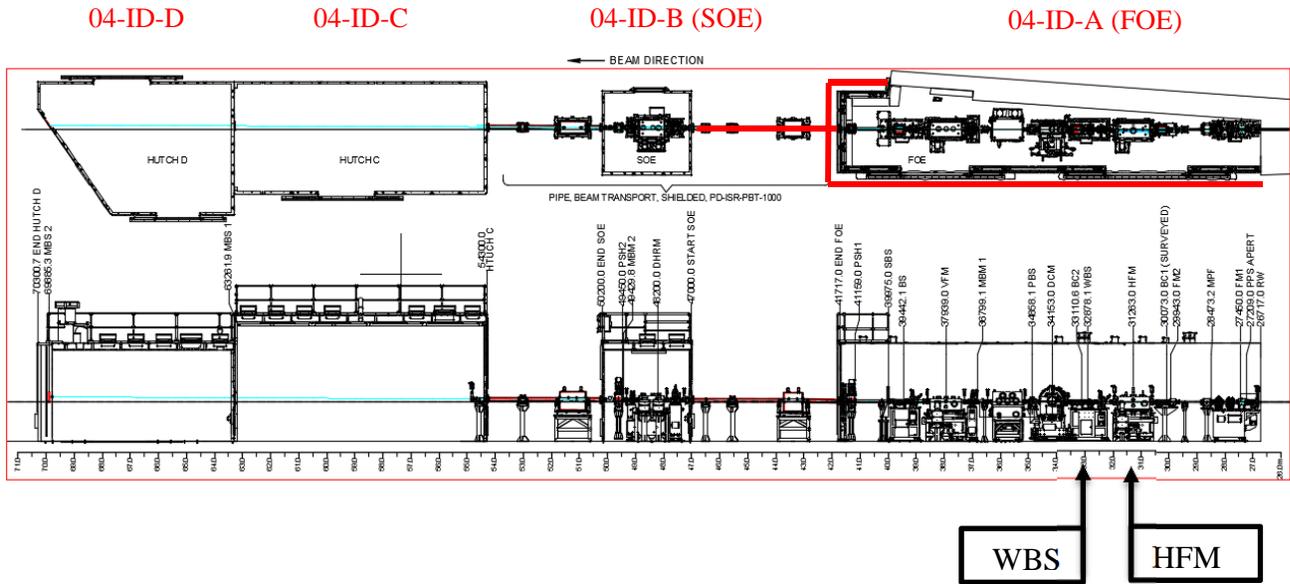
ID Gap: _____
Straight Section Vacuum Conditions: _____
Radiation Survey Results _____
Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

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2. **GB radiation survey: Gap open, FE slits wide open, Insert HFM, survey all walls and roof of the FOE (04-ID-A), and the downstream pipe behind the downstream wall of FOE. **Retract HFM****



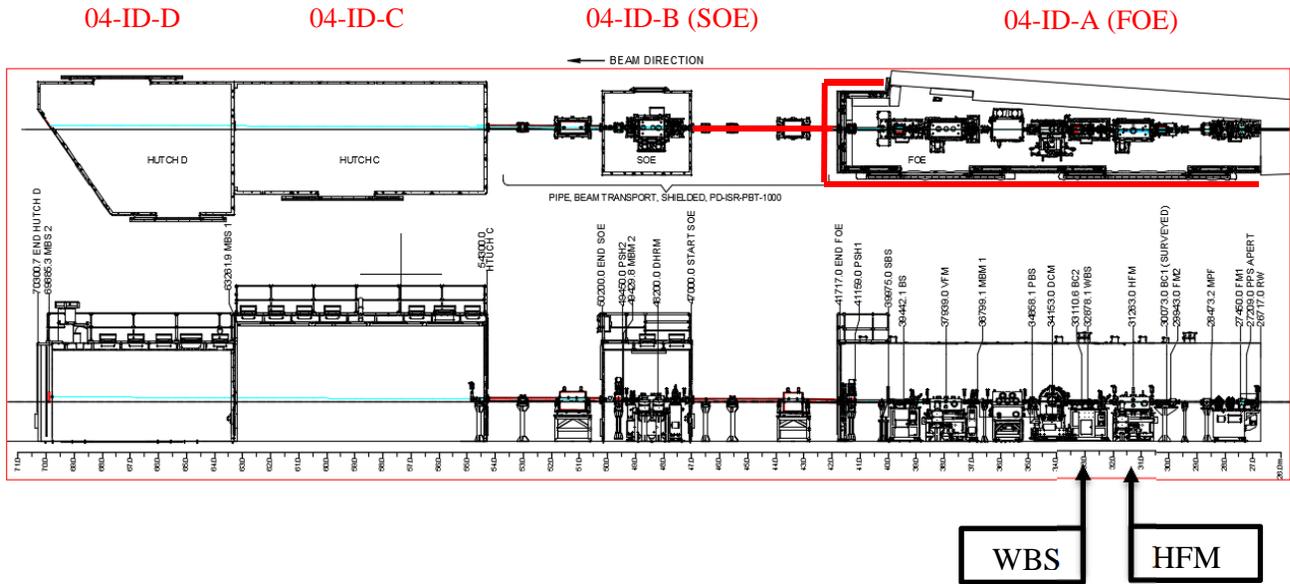
ID Gap: _____
Straight Section Vacuum Conditions: _____
Radiation Survey Results _____
Additional information/comments:

Signature (ESH) _____ *Signature (Beamline)* _____

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3. **Close ID Gap, white beam on WBS, survey all walls and roof of the FOE (04-ID-A), and downstream pipe behind downstream wall of FOE.**



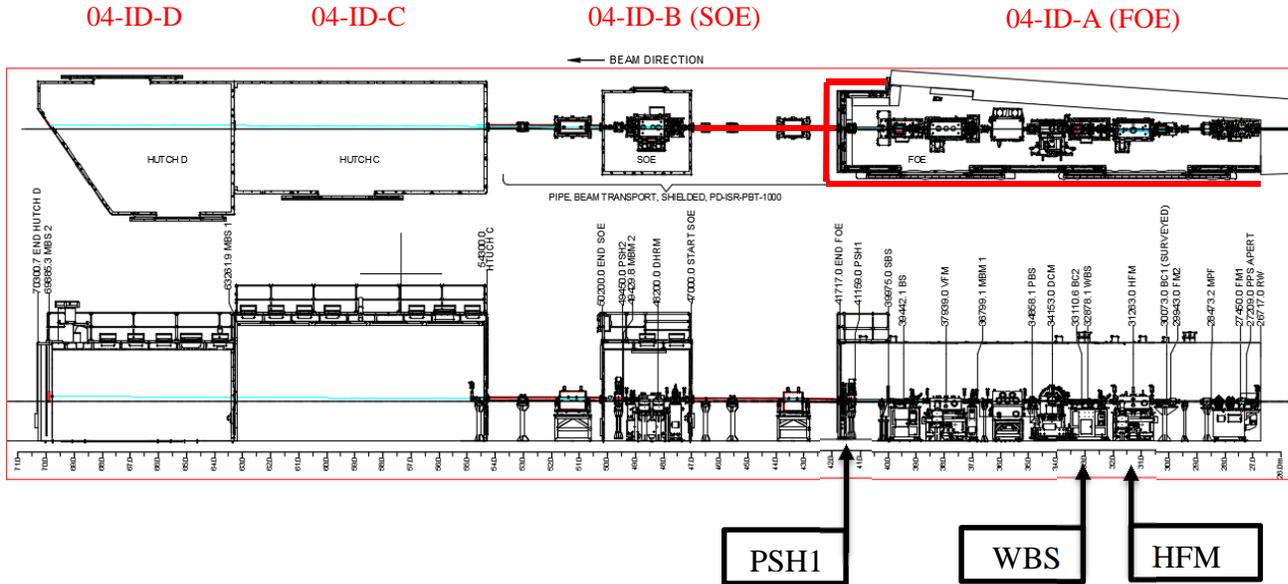
ID Gap: _____
Straight Section Vacuum Conditions: _____
Radiation Survey Results _____
Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

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4. Close ID to minimum gap (6.1 mm), insert HFM at 0.15 degrees (2.62 mrad) incident angle, white beam on HFM survey all walls and roof of the FOE (04-ID-A), and downstream pipe behind downstream wall of FOE. **Survey exit mono beam transport pipe downstream from 04-ID-B to verify the integrity of 04-ID-A PSH.**



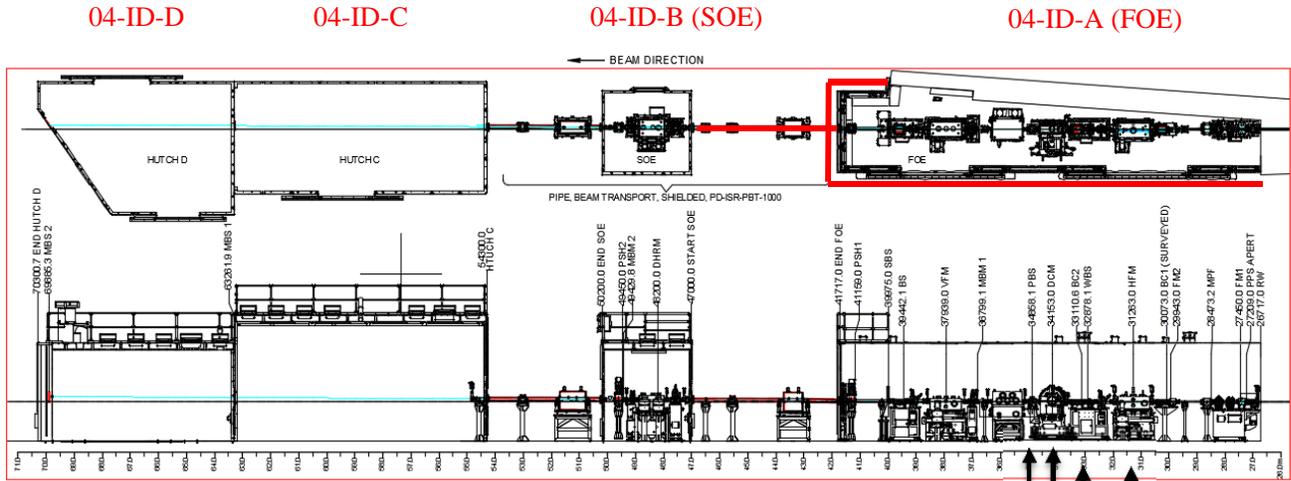
ID Gap: _____
Straight Section Vacuum Conditions: _____
Radiation Survey Results _____
Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

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5. **Set DCM Bragg angle to pass undulator harmonic (nominal values), survey all walls and roof of the FOE (04-ID-A), and downstream pipe behind downstream wall of FOE.**



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

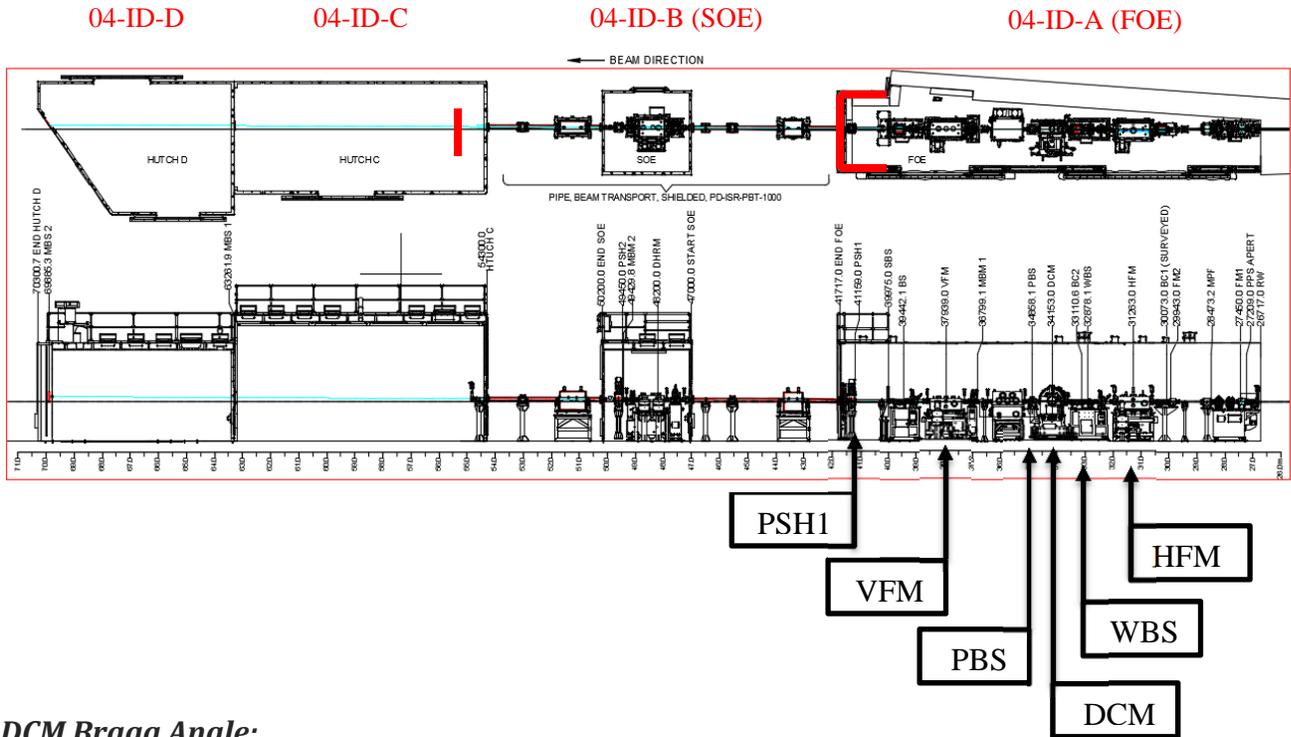
Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

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6. **Insert VFM and set it to incident angle of 0.15 degrees (2.62 mrad), SOE Shutter open, survey all walls and roof of the FOE (04-ID-A), near Photon Shutter 1, and downstream pipe behind downstream wall of FOE and exit mono beam transport pipe to verify the integrity of 04-ID-A PSH.**



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

Additional information/comments:

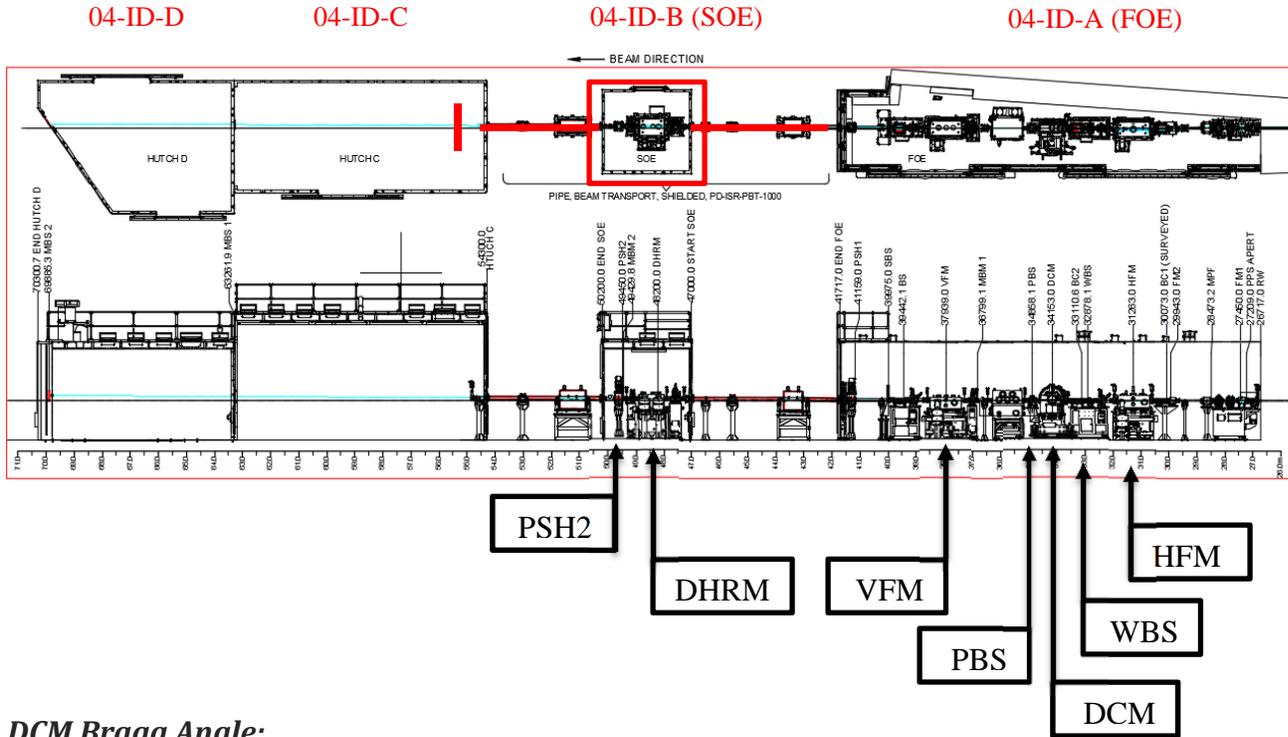
Signature (ESH) _____ **Signature (Beamline)** _____

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II. Check the integrity of 04-ID-B (SOE) and transport pipe.

7. **Open 04-ID-A Photon Shutter 1 to allow beam into 04-ID-B enclosure, survey all walls and roof of the SOE (04-ID-B) and upstream/downstream pipes, and exit mono beam transport pipe.**



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

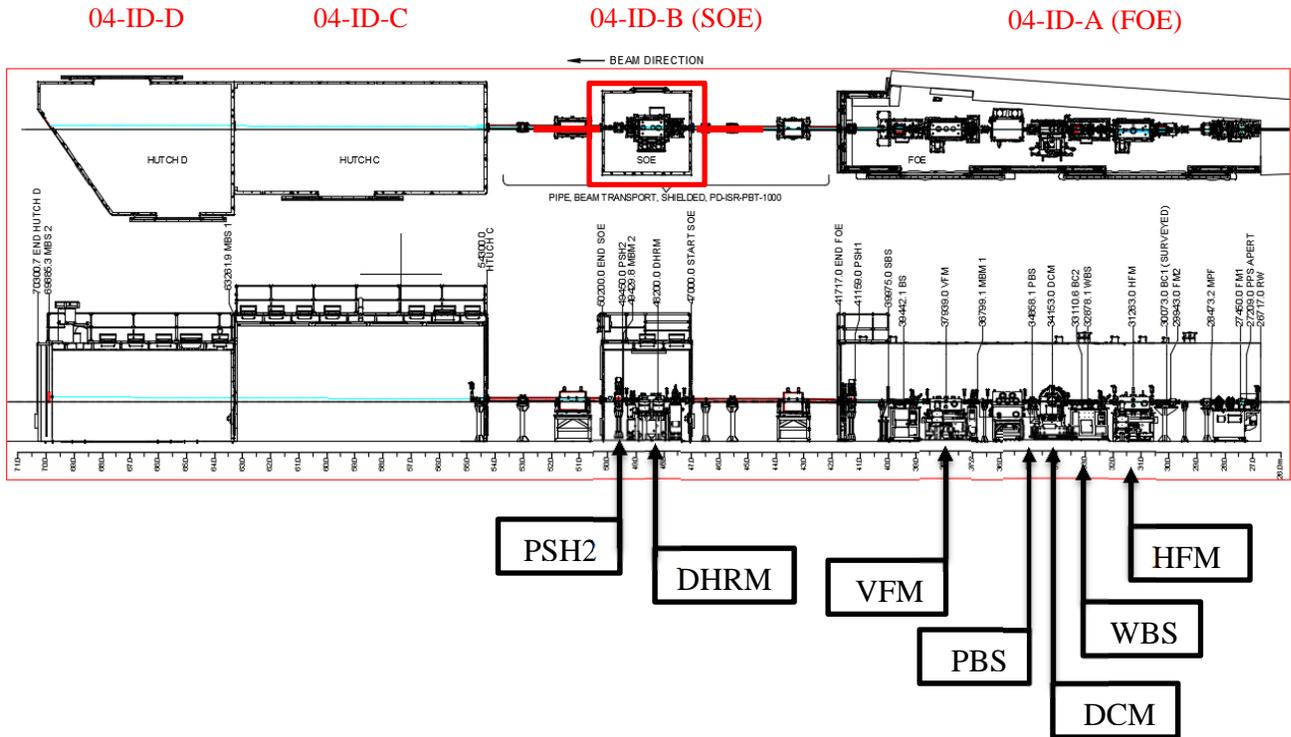
Additional information/comments:

Signature (ESH) _____ *Signature (Beamline)* _____

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8. Same as step 9 but insert DHRM into the beam, survey all walls and roof of the SOE (04-ID-B) and upstream/downstream pipes. **Retract DHRM**



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

Additional information/comments:

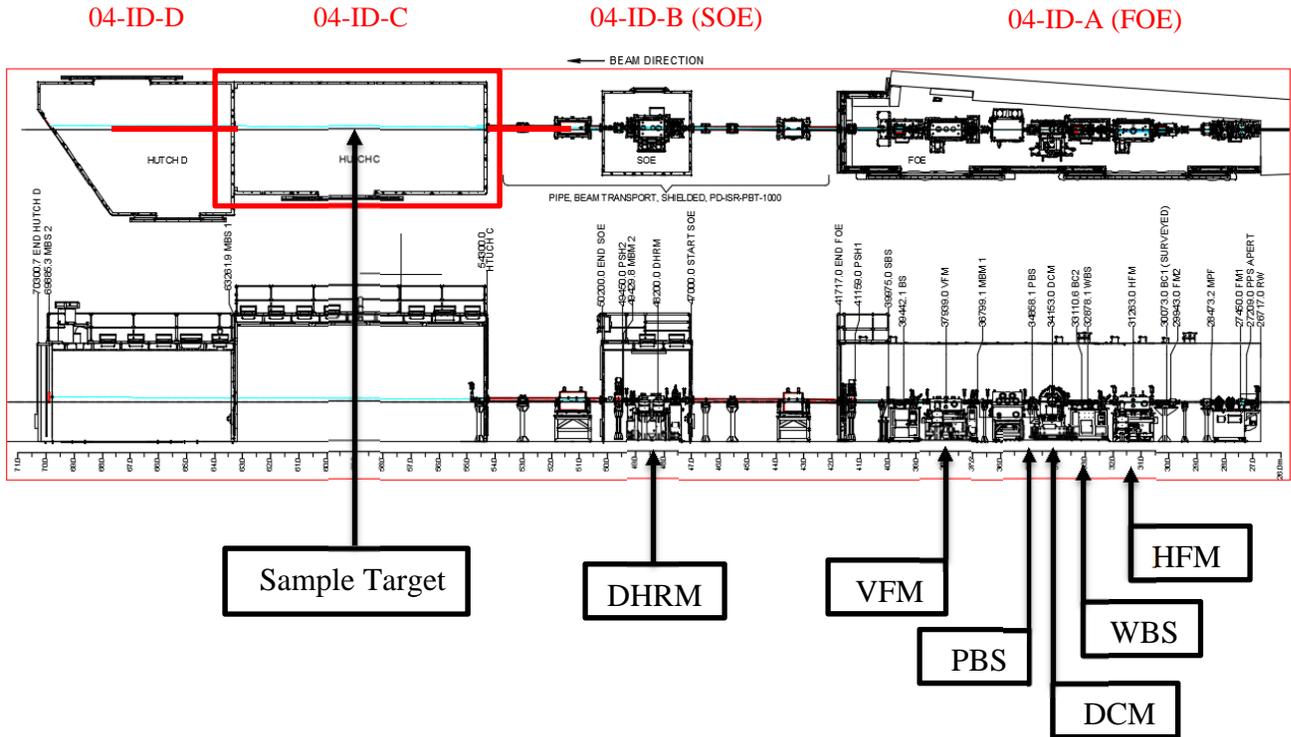
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III. Check the integrity of 04-ID-C, delivery transport pipe and 04-ID-D

- Open 04-ID-B Photon Shutter 2 to allow beam into 04-ID-C enclosure, insert sample target at sample location, survey all walls and roof of 04-ID-C, upstream pipes, and inside 04-ID-D.



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

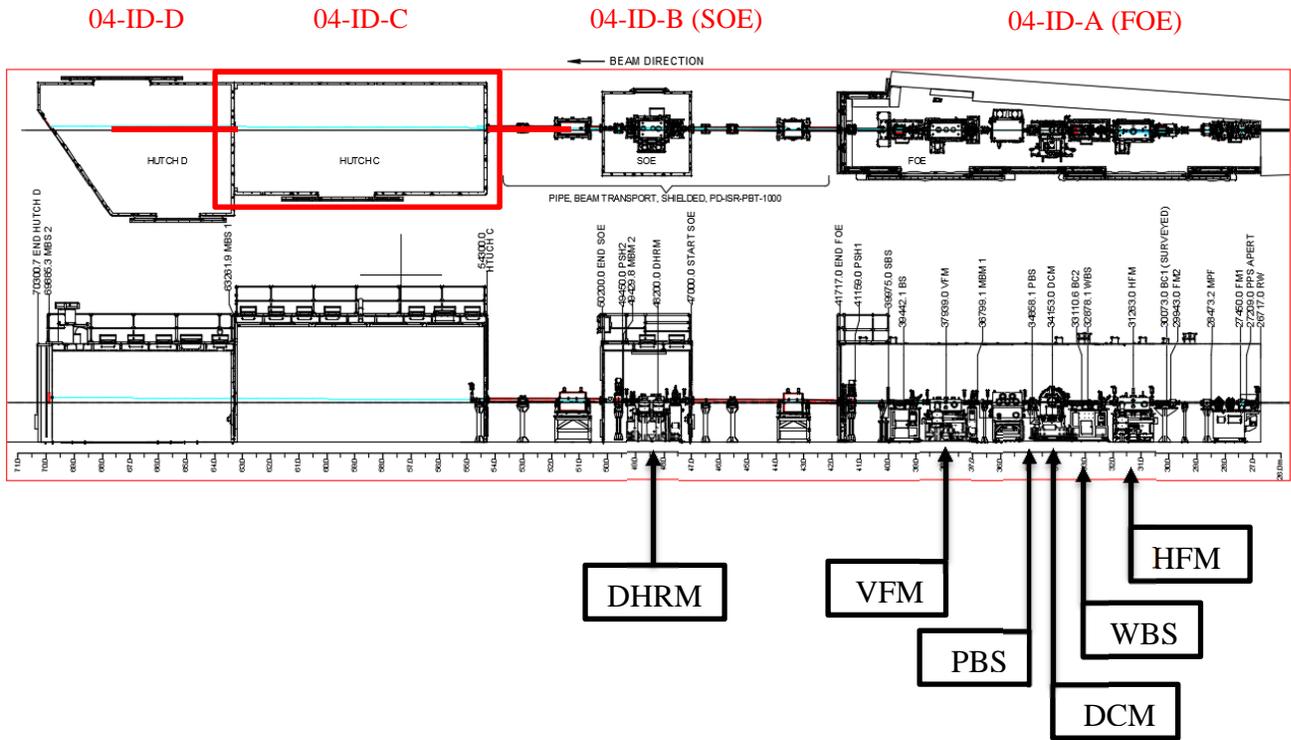
Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

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10. Remove sample target in 04-ID-C to allow beam to strike movable beam stop on the downstream wall of 04-ID-C, survey all walls and roof of 04-ID-C, upstream pipes, and inside 04-ID-D.



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

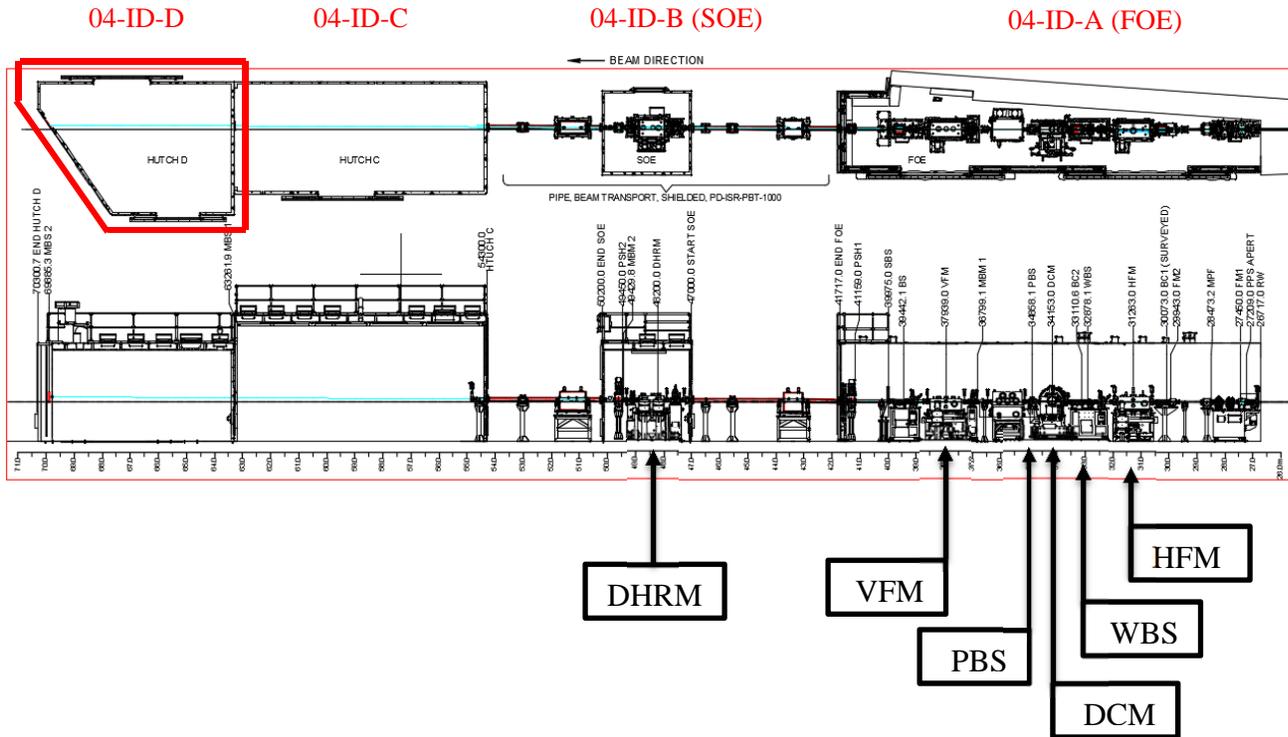
Additional information/comments:

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11. Open 04-ID-C movable beam stop to allow beam to strike beam stop on the downstream wall of 04-ID-D, survey all walls and roof of 04-ID-D.



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

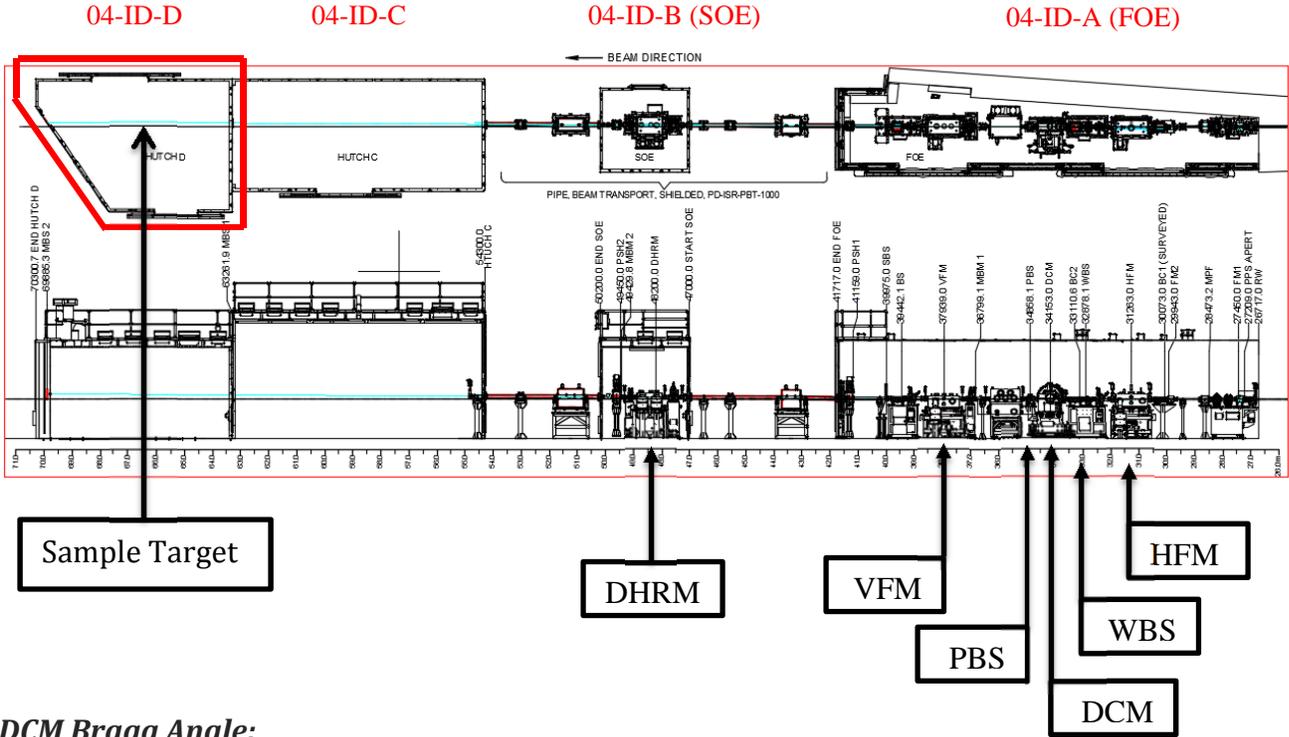
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12. Insert sample target in 04-ID-D at sample location, survey all walls and roof of 04-ID-D.



DCM Bragg Angle: _____

ID Gap: _____

Straight Section Vacuum Conditions: _____

Radiation Survey Results _____

Additional information/comments:

Signature (ESH) _____ **Signature (Beamline)** _____

Survey end date and time: _____

Additional attachment, information or comments:

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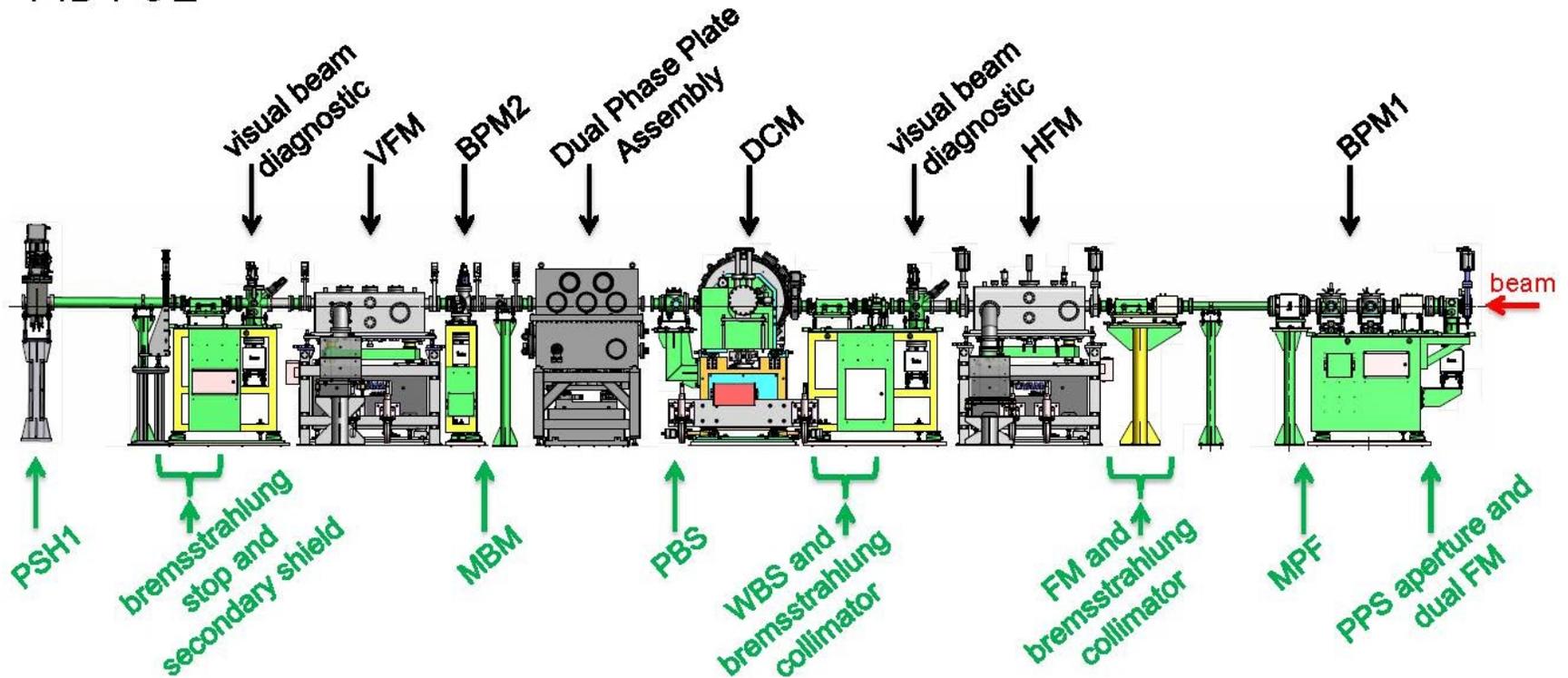
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Attachment A - Beamline Enclosure Diagram, 4-ID-A (FOE)

4-ID FOE



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Attachment A - Beamline Enclosure Diagram, 4-ID-B (SOE)

