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C-A OPERATIONS PROCEDURES MANUAL

15.10.2.5 Optically Pumped Polarized Ion Source (OPPIS) Operation Manual
(Preinjector Systems/LINAC Group Procedure LN043)

Note: This document was formerly a C-A Group Procedure. The content of the group procedure was reviewed by the Technical Supervisor. All approvals and/or issue dates of the original group procedure are maintained for present use.

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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 Collider-Accelerator Department Chairman _____
Date

A. Zelenski

Preinjector Systems/LINAC Group Procedure LN043
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COLLIDER-ACCELERATOR DEPARTMENT

Title: Optically Pumped Polarized Ion Source (OPPIS) Operation Manual

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LN043 - Optically Pumped Polarized Ion Source (OPPIS) Operation Manual

1. Purpose

- 1.1 To provide instructions for Linac specialists on how to turn on the polarized proton ECR ion source.

2. Responsibility

- 2.1 Linac specialists are responsible for executing this procedure.

3. Prerequisites

- 3.1 The source vacuum must be below 1×10^{-6} torr.
- 3.2 The supplemental chilled water system must be on.
- 3.3 The Linac Dry Nitrogen Gas System must be available.
- 3.4 The Ionizer High Voltage Cage must be interlocked with the Extractor Modulator.
- 3.5 Qualified and trained Linac staff.

4. Precautions

- 4.1 When the source is operating voltages up to 35 kV are present.
- 4.2 The source uses hydrogen, rubidium and sodium during operation.

5. Procedure

5.1 ECR Primary Proton Source Operation

- 5.1.1 Turn local water cooling system, located in the basement, "on". Turn nitrogen cooling line for the ECR cavity "on", turn air cooling line for the third grid "on".
- 5.1.2 Turn tube P.S. main breaker "on", wait 5 minutes for filament heating and then turn HV P.S. "on". Anode voltage will come on with a 2 sec delay and microwave power will be observed in the forward power meter (400-800 W).
- 5.1.3 Pump hydrogen supply line with the roughing pump and open the valve to supply hydrogen to the ECR source.
- 5.1.4 Turn HV P.S. for the extraction grids "on" (first grid +3.2 kV, second grid +2.5 kV, third grid +50 volts).

5.2 Rb Cell Operation

- 5.2.1 Check the zero Faradey rotation angle.

- 5.2.2 Turn air cooling line "on".
- 5.2.3 Make sure that proton beam is on and then turn the cell heat "on" (40-50V).
- 5.2.4 Monitor the Rb vapor thickness by Faraday rotation, the operational thickness is 6-10°.

5.3 Sodium Ionizer Cell Operation

- 5.3.1 Turn cooling water "on" and turn ionizer P.S. "on".
- 5.3.2 Lock the door to HV cage and return the key to the extractor P.S.
- 5.3.3 Turn cooling air for the heater ends, collector and trap "on".
- 5.3.4 Turn reservoir and nozzle heaters "on" Operational temperatures are 450-470°C.

5.4 32 kV Extractor Operation

- 5.4.1 Lock the extractor P.S. and turn extractor P.S. "on", setpoint 32 kV.

5.5 35 kV LEBT Operation

- 5.5.1 Turn cooling water for the dipoles "on" Turn "on" dipoles P.S. and Quadrupole P.S. Check the set point.
- 5.5.2 Tune the beamline elements for the best current to the beam monitors and FC.

6. Documentation

- 6.1 None.

7. References

- 7.1 None.

8. Attachments

- 8.1 None.