



INDux Training Course
Basic Level
Modules 1 and 2

GENERAL INFORMATION ON TRAINING COURSE

GOALS	- Familiarization with the Rhodotron® and its main subsystems and improvement of the level of autonomy in its use. - Familiarization with the RF and cooling systems.
LOCATION	INDux center
PROGRAM	See table below
DURATION	5 full days for each module
ATTENDANCE	5 -8 persons
TRAINEE'S PRE-REQUIREMENT	The trainees should be fluent in English, having an adequate degree of experience and technical expertise corresponding to the responsibilities involved.

Certificate of attendance will be issued to the trainees at the end of the training week.

BASIC 1

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
RHODOTRON DISCOVERY	VACUUM SYSTEM	E-SOURCE CATHODE REPLACEMENT	POWER SUPPLIES BASIC	CATHODE REGENERATION
<ul style="list-style-type: none"> - The journey of electrons. - Identification of subsystems & components. - Use of mechanical tools, identification of materials, vacuum seals. - Rhodotron factory visit. 	<ul style="list-style-type: none"> - Theory of vacuum, working principles, units and ranges. - Practical exercises: pumps replacement, leak detection, vacuum controller (TPG). 	<ul style="list-style-type: none"> - Description of E-source subsystems components. - First introduction to the Rhodotron HMI (human machine interface) and to the use of an oscilloscope. - E-beam and X-ray theory. 	<ul style="list-style-type: none"> - Identification of the main devices composing a power supply. - Discussion about the typical failures of these devices. - Identification of cables and assembly of connectors. 	<ul style="list-style-type: none"> - E-source high voltage conditioning, reactivation. - E-source socket disassembly. - E-source beam tuning (simulator).

BASIC 2

MONDAY & TUESDAY	WEDNESDAY & THURSDAY	FRIDAY
INTRODUCTION TO THE WORLD OF RADIO FREQUENCY AND TO DEIONIZED WATER <ul style="list-style-type: none"> - Transmission line, impedance matching, standing wave and use of the network analyzer. - Introduction to the Rhodotron RF chain, practical exercises on each amplifier in the chain (Pre-Driver, Driver and tetrode RF tube). - Testing the impact of the deionized water, replacement of the deionization bottle. - Preventive maintenance – general tasks. 	BEAM CURRENT MONITORING, RF CHAIN REGULATION (LOW-LEVEL RF RACK) AND FINAL POWER AMPLIFIER DISCOVERY (FPA) <ul style="list-style-type: none"> - DCCT working principle & calibrations. - Introduction to the LLRF parameters and its regulation loops (voltage and frequency). - Disassembly of Final Power Amplifier, Kapton sheets replacement and High voltage tests. 	DRIVER AMPLIFIER, DOCUMENTATION & TRAINING MODULE SUMMARY <ul style="list-style-type: none"> - Driver tetrode replacement and Driver input tuning. - Wiring list and Bill of Material (BOM) usage. Introduction to troubleshooting. - Recap of Basic Modules 1 & 2.

