

Status of the SABINA project

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27/06/2022

SABINA: A RESEARCH INFRASTRUCTURE AT LNF

Regione Lazio – public call: «Potenziamento delle Infrastrutture di Ricerca PNIR per elevare il tasso di innovazione del tessuto produttivo regionale» (*aka Research Infrastructures*) POR-FESR 2014-2020

GOAL: set up an infrastructure for users (both scientific and industrial) by upgrading the **SPARC** photoinjector

Faults and
downtime
analysis

Technological
plants update

Increase of
the uptime

Critical
components
analysis

Scientific
equipment upgrade

Improvement of
the performance

User facilities:

- THz line
- Power laser

SABINA:

SOURCE OF **A**DVANCED **B**EAM IMAGING FOR **N**OVEL **A**PPPLICATIONS



GOAL: strengthening of SPARC - increase of the uptime

- Technological plants renewal (compressed air system, dry cooler, , demineralized water system, network...)
- Update of equipment (photocathode laser, injector, modulator, beam manipulation, diagnostics, ...)
- Creation of two user facilities: THz and FLAME
 - THz: spectroscopic analysis (single point or imaging), also at cryogenic T
 - FLAME: surface coating tests (green, infrared), vacuum tests

BUDGET: about **6.1 M€** (4.5M€ Regional funds POR-FESR, 1.6M€ INFN)

STATUS: Kick off **Sept. 2019**, present deadline **April 2023 – not feasible**
new deadline to be discussed with Regione Lazio: **Oct. 2023?**



STATUS

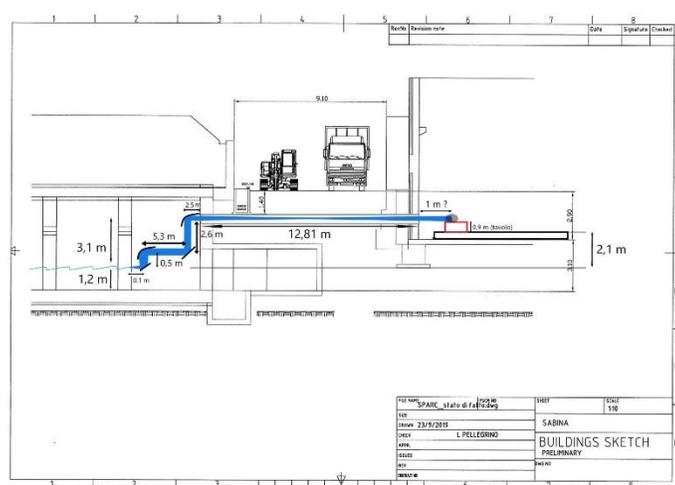
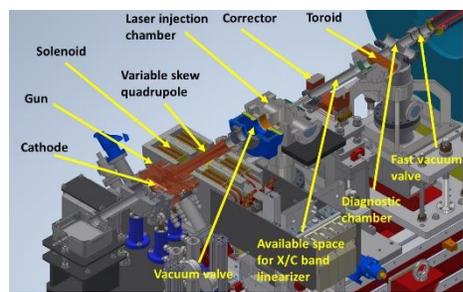


		STATUS	TO DO
Photoinjector		Installed and tested	✓
Photocathode laser		In production	Installation: autumn-winter 2022-2023
Oscillator		Installed and tested; failure: repaired	✓
Magnets	Solenoids	In production	Installation: spring 2023
	Other magnets	Still in discussion	
Undulator		In production	Installation: spring 2023
THz optics		Optical simulations: done Layout of the transport line: ongoing	Place orders for optics, detectors, vacuum pipe, motors
Users' equipment	Cryostat	Delivered and tested	✓
	Oscilloscope	Delivered and tested	✓
Diagnostics	Digitizer	Delivered and tested	✓
	Toroids	Delivered and tested	✓
	BPM Monitor	Delivered and tested	✓
Modulator		Delivered and tested	✓

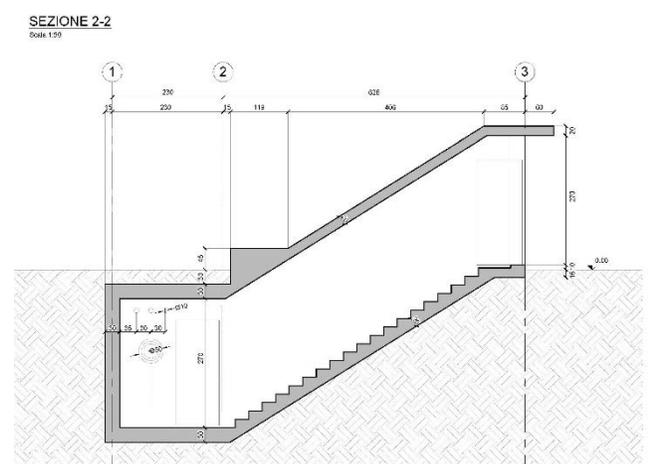
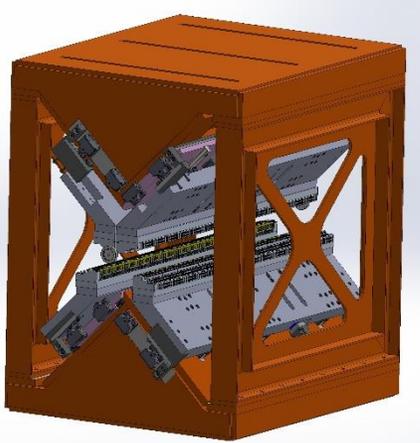
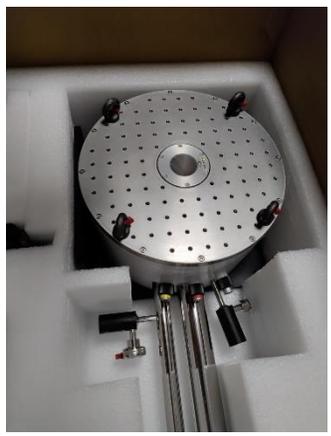
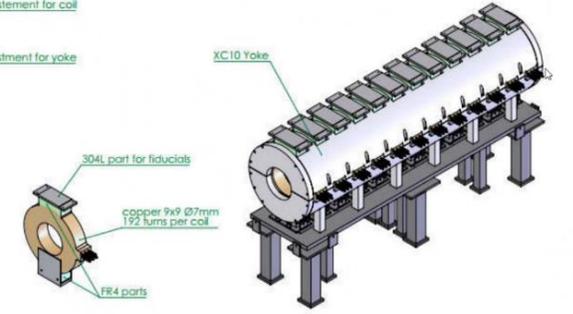
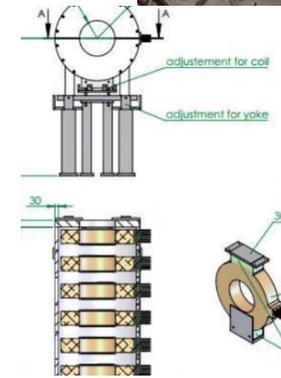
STATUS



		STATUS	TO DO
LLRF	LLRF	Delivered and tested	✓
	Power amplifier	Delivered and tested	✓
	BOC	Delivered and tested	✓
Technological plants	Thermocryostats	Delivered and tested	✓
	Compressed air	Project ongoing	
	Demineralized water	Completed	✓
	Dry cooler	Order in progress	Installation in autumn-winter 2022-2023
	ATU	---	---
Network	Distrib. idraulica	Project ongoing	
	Cabling	Completed	✓
Civil Engineering	Hardware	Delivered and tested	✓
	Electrical distribution	Completed	✓
	Lightning	Completed	✓
	Clean room for users	Completed	✓
	Tunnel	Project ongoing	STARTING NOT BEFORE NOV. 2022
Cabling		Design of new cabling; naming	Local cabling after installations



FILE NO.	SPAC	DATA	1/20	SHEET	1/20
DATA	23/9/2015	PROGETTISTA	SABINA	PROGETTO	1/20
DATA		REDAZIONE	L. PELLEGRINO	PROGETTO	1/20
DATA		REDAZIONE		PROGETTO	1/20
DATA		REDAZIONE		PROGETTO	1/20
DATA		REDAZIONE		PROGETTO	1/20
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DATA		REDAZIONE		PROGETTO	1/20



PHOTOCATODE LASER



- Tender assigned to Amplitude
- Periodic technical meetings ongoing
- Laser could be delivered in autumn 2022 BUT probably we will ask Amplitude to delay the installation a couple of months
- The oscillator must be sent to Amplitude for tests (sept?)
- The installation of new laser requires first the disassembly of present laser and its relocation in another lab, hopefully directly the THz users room

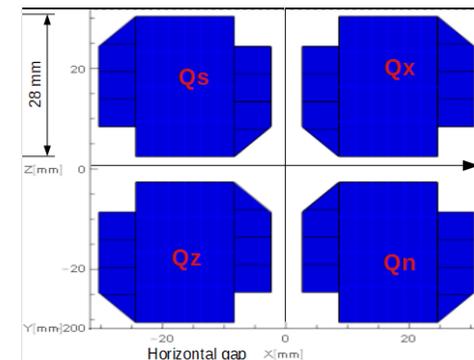
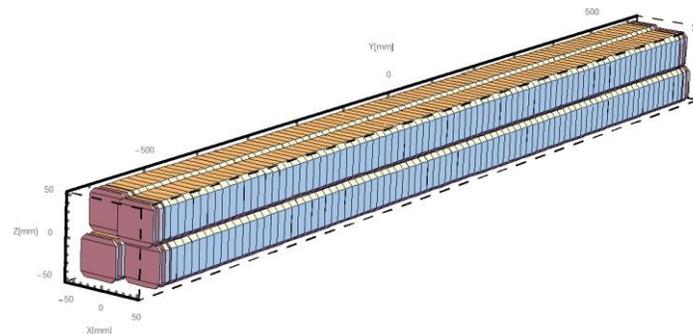
SOLENOIDS

- Tender assigned to SigmaPhi
- Tender assigned in Nov. 2021 **BUT** contract signed only last week
- Solenoids are expected to be delivered NOT BEFORE april 2023
- Installation has a strong impact on SPARC activities (removal of gun, vacuum pipe, cabling, cooling...)



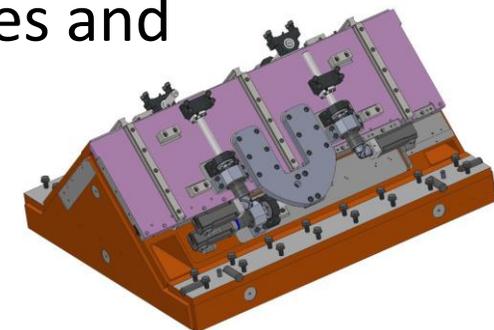
UNDULATOR

- Tender assigned to Kyma
- Periodic technical meeting ongoing
- FDR now in approval phase
- A huge work has been done for mechanical design (study of forces and deformation)



Two concerns:

- Permanent magnets → solved
- Electronics → important delays in procurement



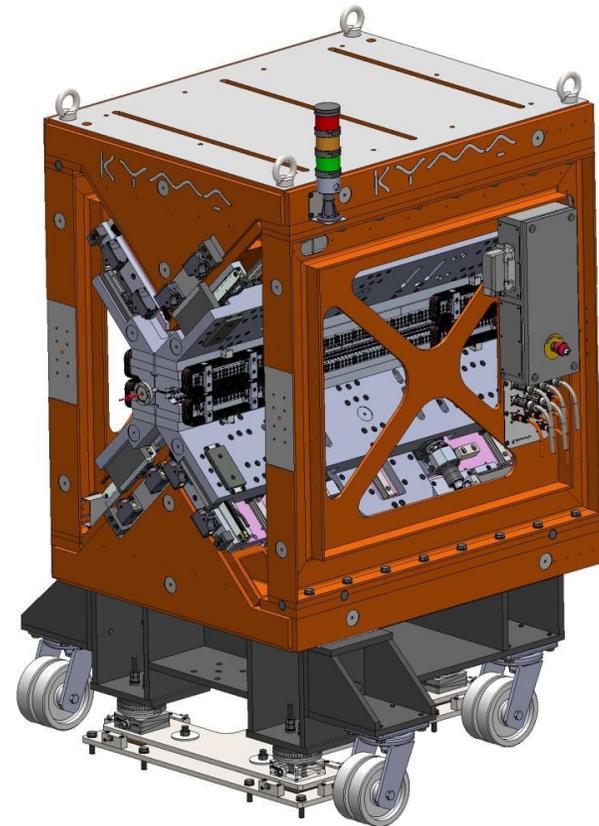
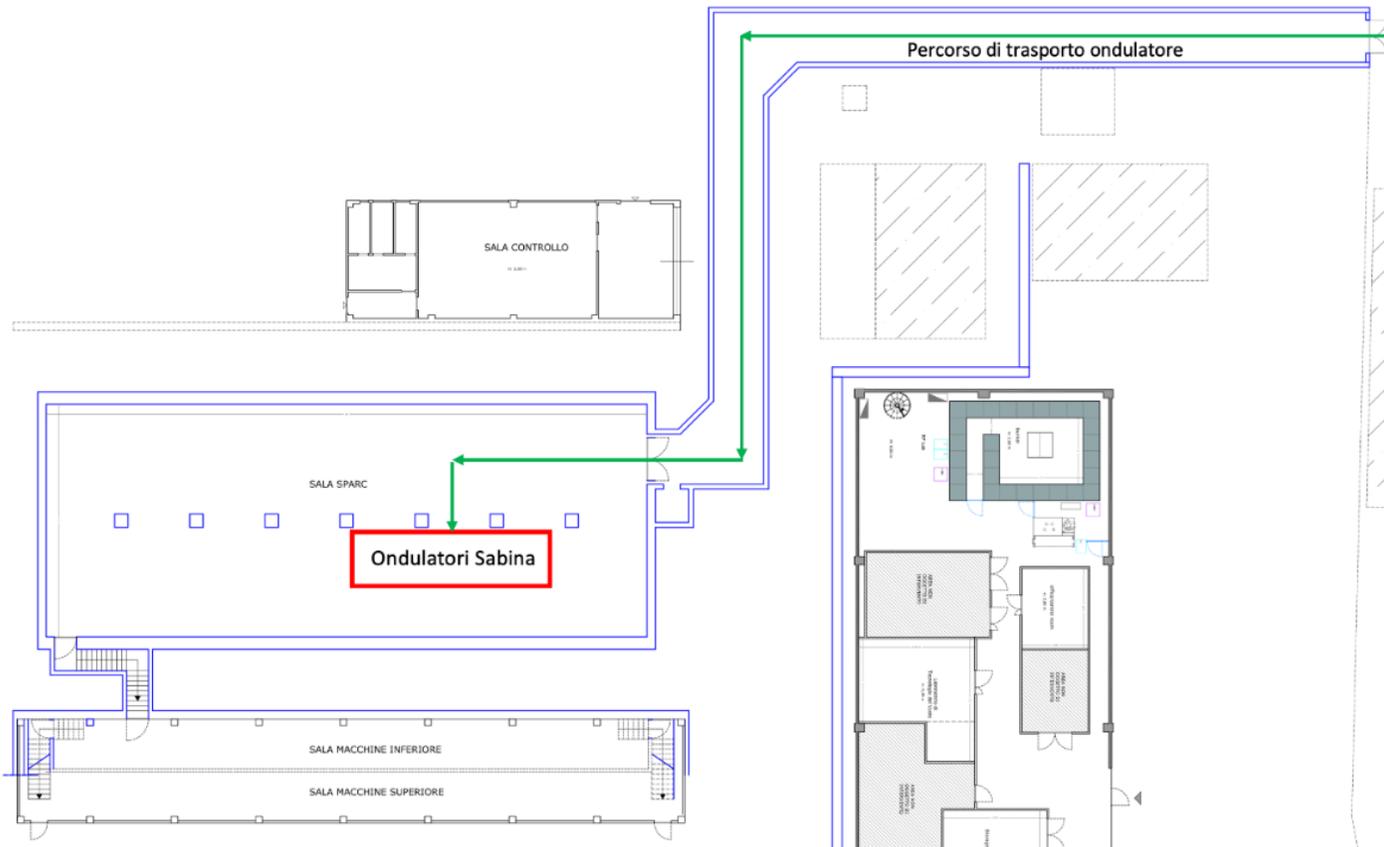
First module expected to be delivered NOT BEFORE april 2023

Before installation mechanical measurements will be done – preparatory for EuPRAXIA

UNDULATOR

WARNING:

the 3 modules must be transported through the bunker emergency exit



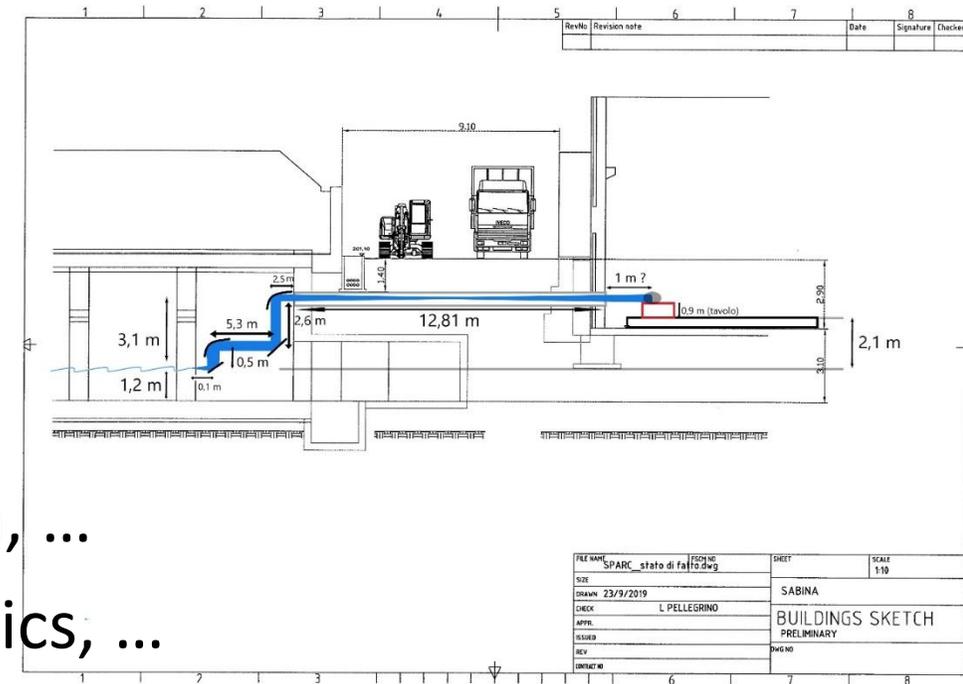
THZ LINE

Transport line design: ongoing

- Vacuum, mechanics, optics, radioprotection, ...
- Still to be purchased: vacuum pipe, mechanics, ...

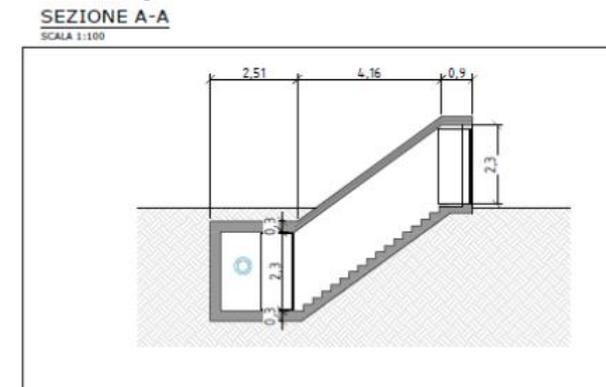
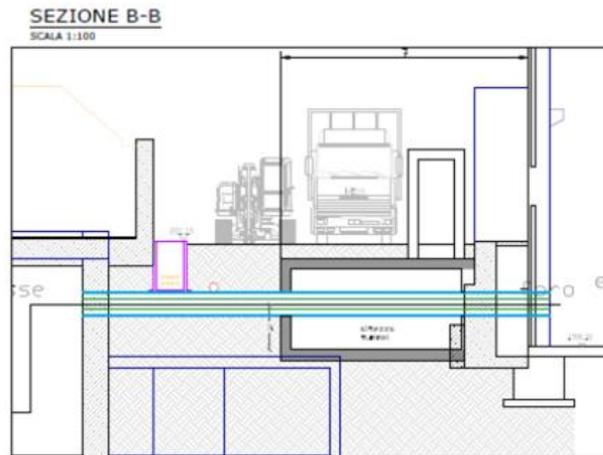
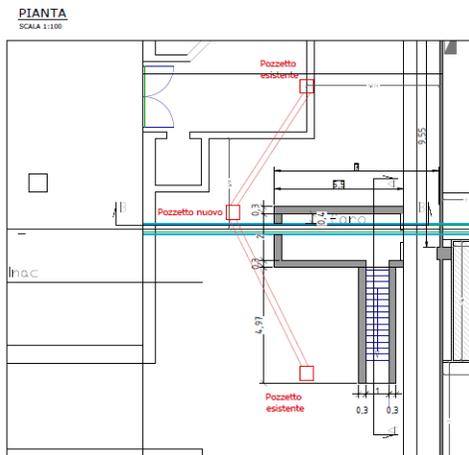
Optics:

- Simulations have been performed, different configurations exist
- Still to be purchased: mirrors, detectors



TUNNEL

- Project almost ready
- The mid point of the transport line will be accessible for check and maintenance of diagnostics
- Authorization procedure to be started soon (60 days)
- Excavation not before November
- Interference with activities at SPARC and building #7



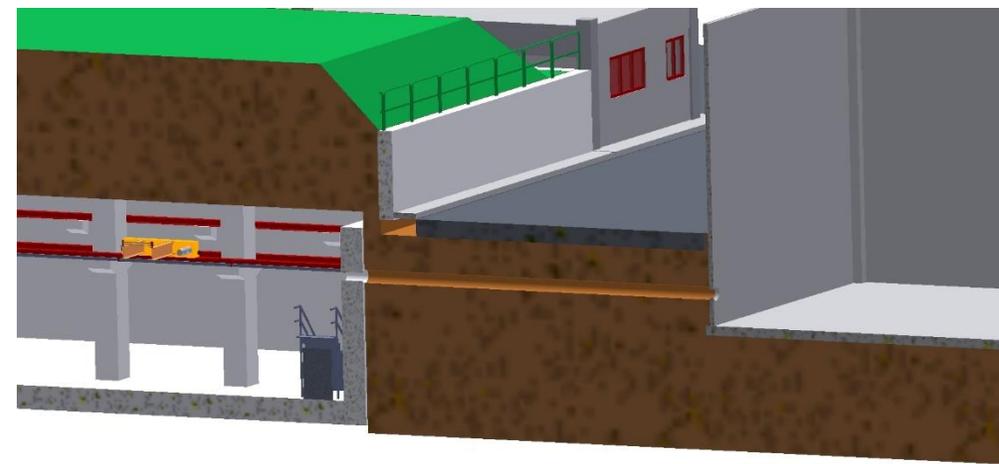
PLANTS

Dry cooler:

- It could be shipped at LNF at the end of September BUT
- Support platform still to be designed
- Installation NOT BEFORE november 2022

Modification of SPARC hydraulic distribution:

- Still to be discussed in details
- Is it probably too late?



TENTATIVE CHART

	2021				2022												2023											
	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12
UND.	GE																			X	T	X	X			INST.		
SOL.	commiss.	GE																		X						INST.		
LASER		GE			GE									X		INST.												
TUNNEL											P																	
DRY C.														X		INST.												

Current DEADLINE

New?

A detailed chart exists but relies on hypothetical dates – new inputs needed
 Periodic meetings with suppliers and with Technical Division in agenda



Synergies with other LNF - PNRR activities

PNRR IRIS: call «Research Infrastructures»

Leader: INFN - local res. L. Sabbatini

- Equipment for magnetic measurements of undulators
- Personnel (1 technologist, 2 technicians, for mag. measurements)



PNRR Rome Technopole: call «Innovation ecosystem»

Leader: Sapienza - local resp. S. Pioli, S. Bertelli, L. Sabbatini

- Upgrade of research infrastructure LATINO and SABINA
- Personnel (1 technologist for THz line)

