EuPRAXIA@SPARC_LAB:
Machine Layout

Andrea Ghigo

EuPRAXIA Building rendering (front view)

PROGETTO DEFINITIVO PER LA REALIZZAZIONE DEL NUOVO COMPLESSO EDILIZIO EuSPARC PRESSO I LNF DI FRASCATI

PROGETTO DEFINITIVO

NUOVO COMPLESSO EuSPARC

Descrizione del progetto:
Progettazione Definitiva e Coordinamento della Sicurezza in fase di progettazione inerente il nuovo complesso edilizio denominato Eusparc atto ad ospitare la nuova macchina acceleratrice dei Laboratori Nazionali di Frascati INFN.

INFN

R.U.P.: Ing. Simona Incremona

PROGETTAZIONE: mythos

Responsabile di progetto:
Ing. Fabio Inzani
Progettista opere architettoniche:
Arch.Stefano Carera
Progettista opere impiantistiche:
Ing. Stefano Bonfante
Coordinatore della Sicurezza in fase di progettazione:
Ing. Luca Giordo

Disciplina di progetto:
PROGETTO ARCHITETTONICO

Elaborato:
Viste renderizzate

01AR.P1.RND.300

REV. N° 0	DATA REV.

Data: 15/01/2021

See Ugo Rotundo presentation

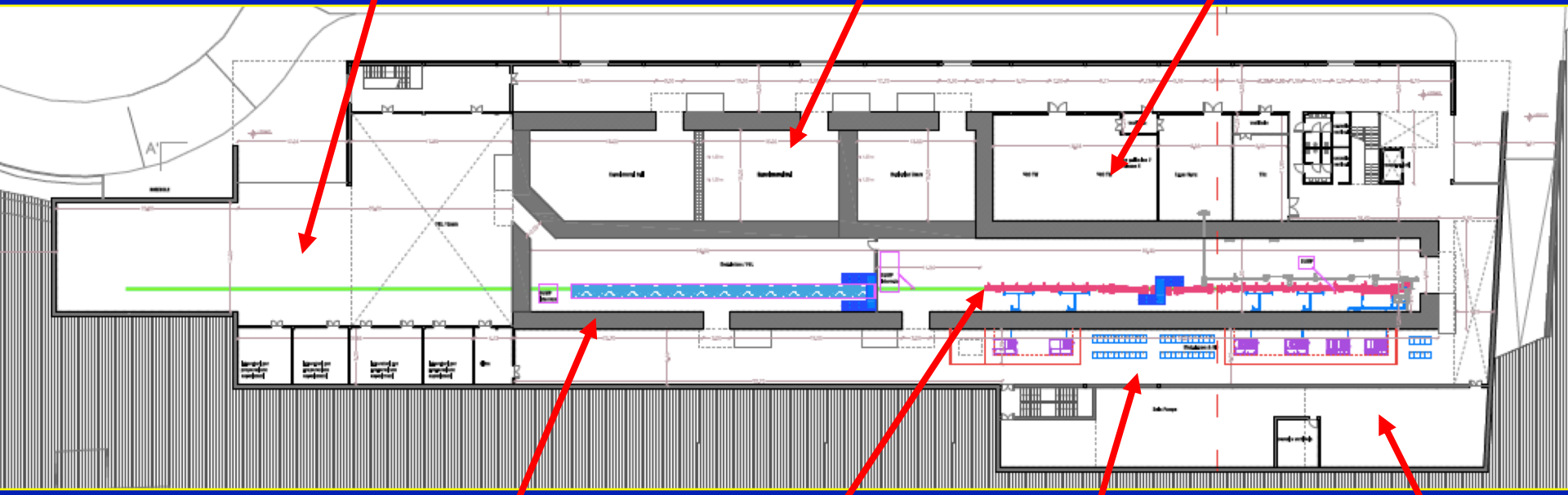
- Adjacent parcel of land has been acquired

Area : 4.900 m²
Volume: 49.000 m³

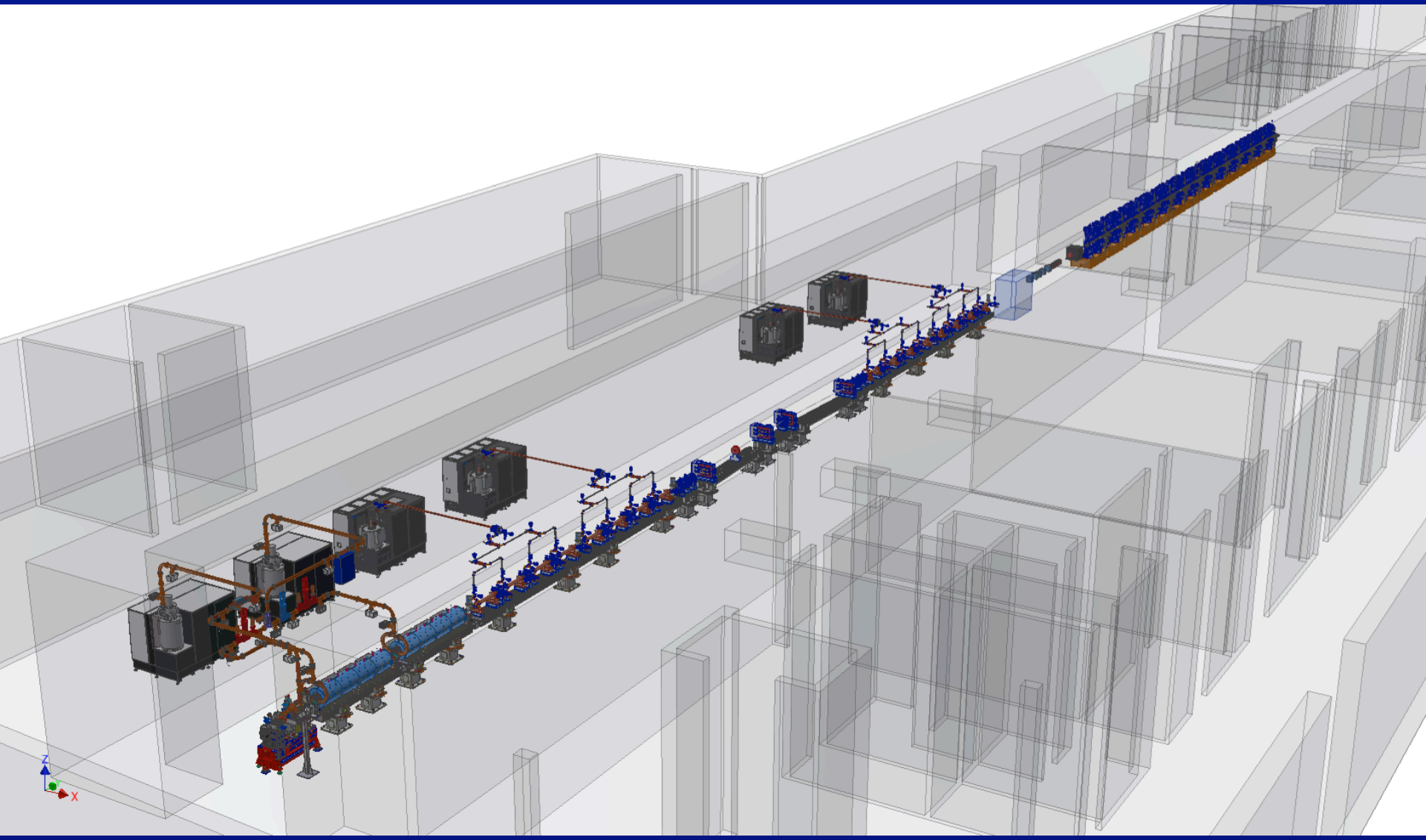
Space available for a more functional working site

EuPRAXIA Site @ LNF

The building layout (ground floor)

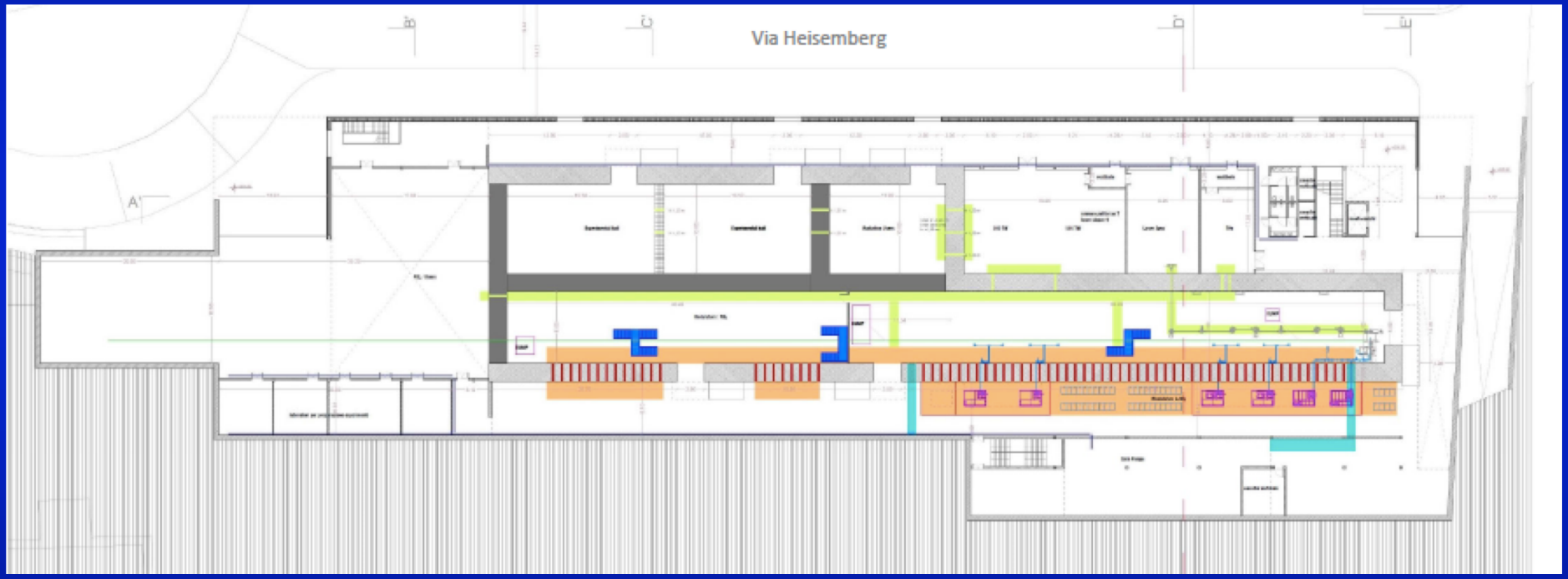


Linac & undulators 3D layout

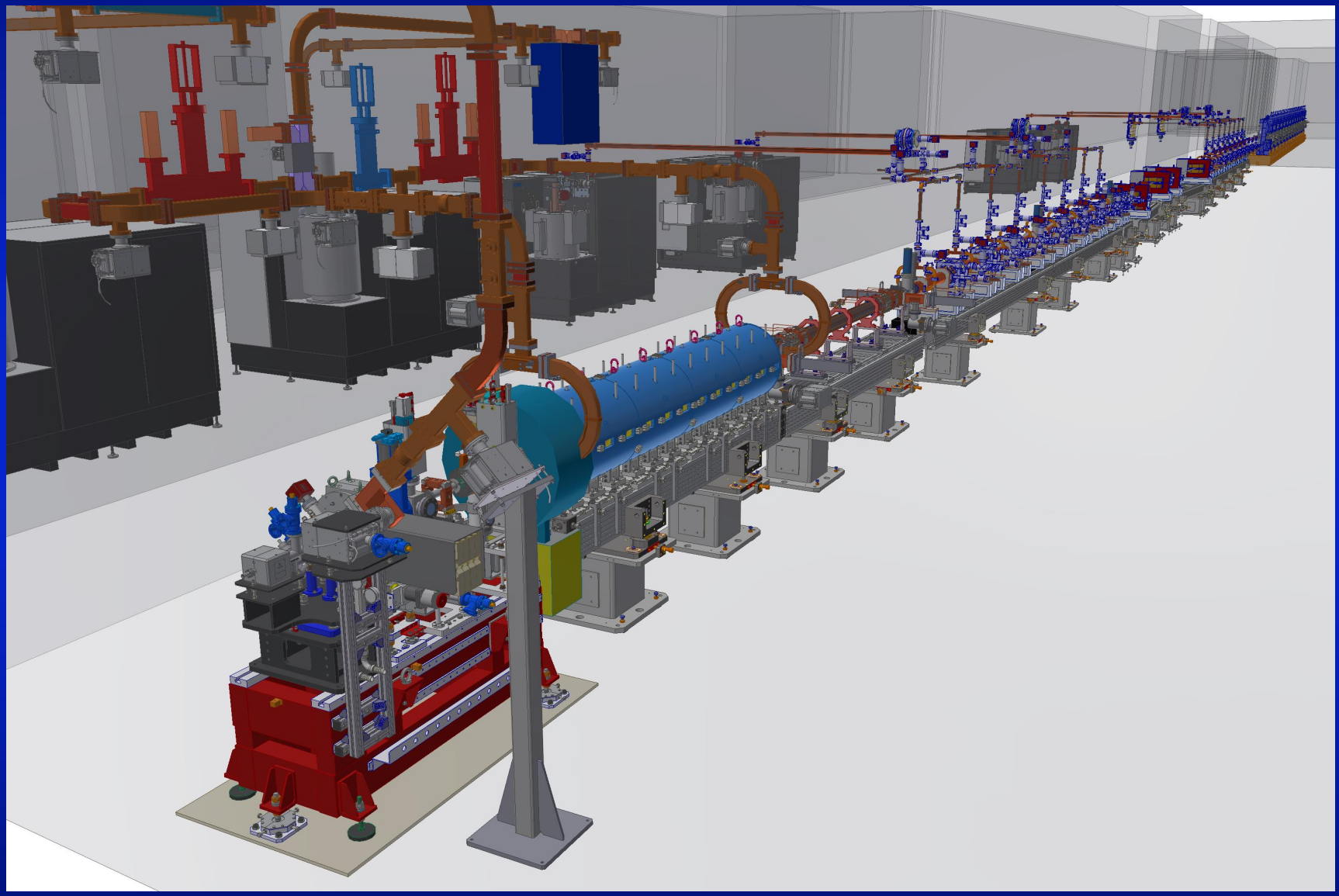


Plants distribution

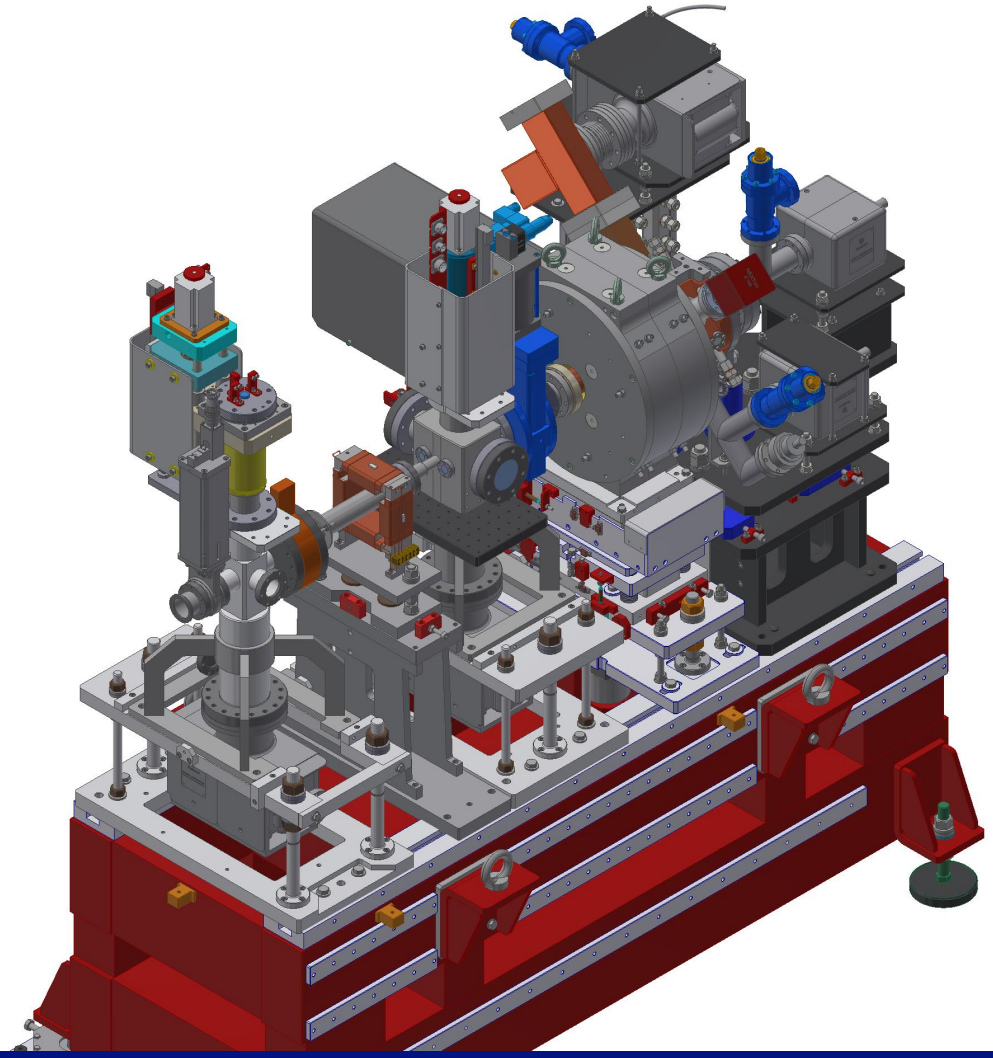
The design of the electrical distribution, air conditioning, temperature stabilization, clean rooms, main water cooling systems has been prepared



EuPRAXIA Linac

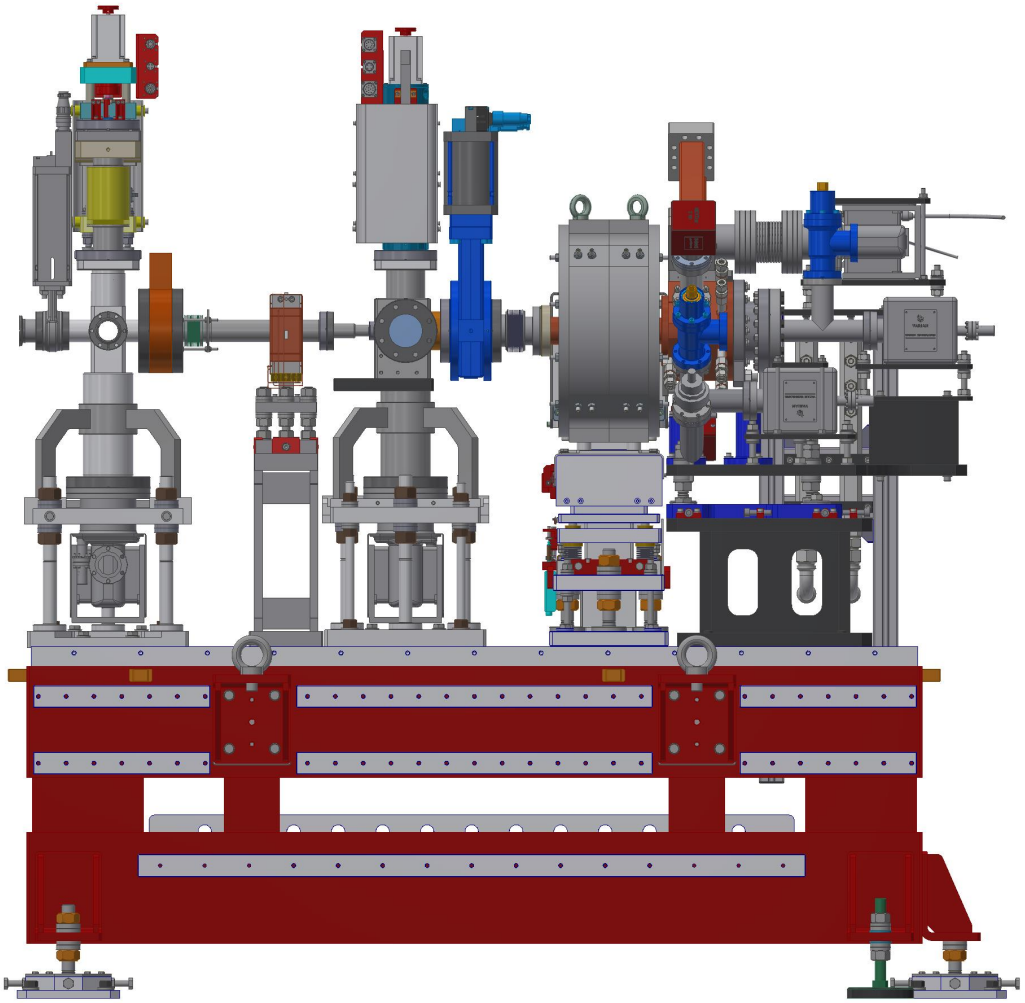


New SPARC Gun



New SPARC Gun Components

- Cathode
- RF Cavities
- Waveguide
- Solenoid
- Valve
- Laser ports
- Corrector
- Current transformer
- Farady cup
- Flag
- Fast valve



RF photoinjector

Photoinjector:

RF Gun

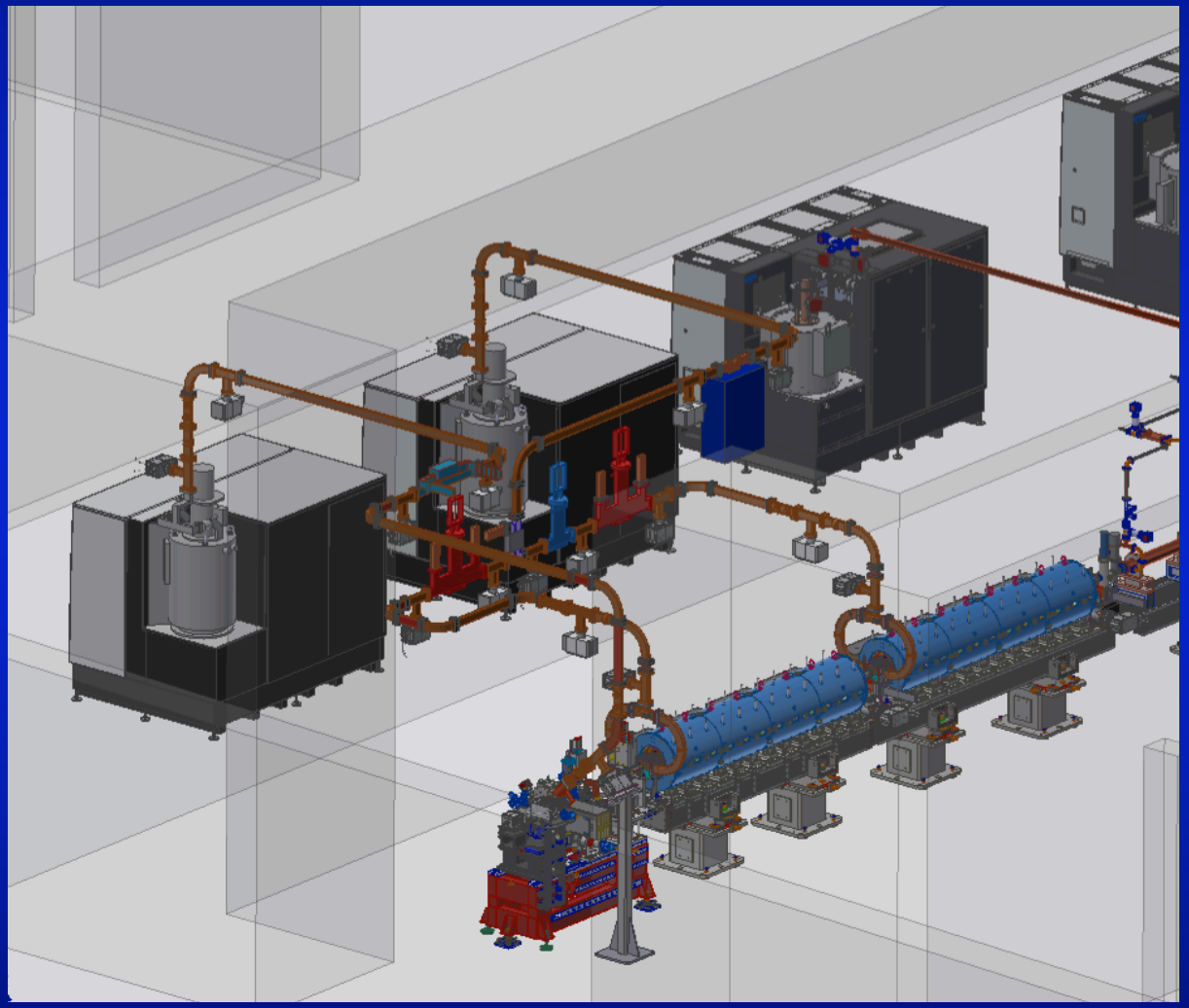
Two 3m S-Band RF accelerating structures

Two S-Band Klystron&modulator power stations.

Solenoids x gun and two accelerating structure

RF pulse compressor (SLED)

Laser Heater module



X-band Linear accelerator

Linac:

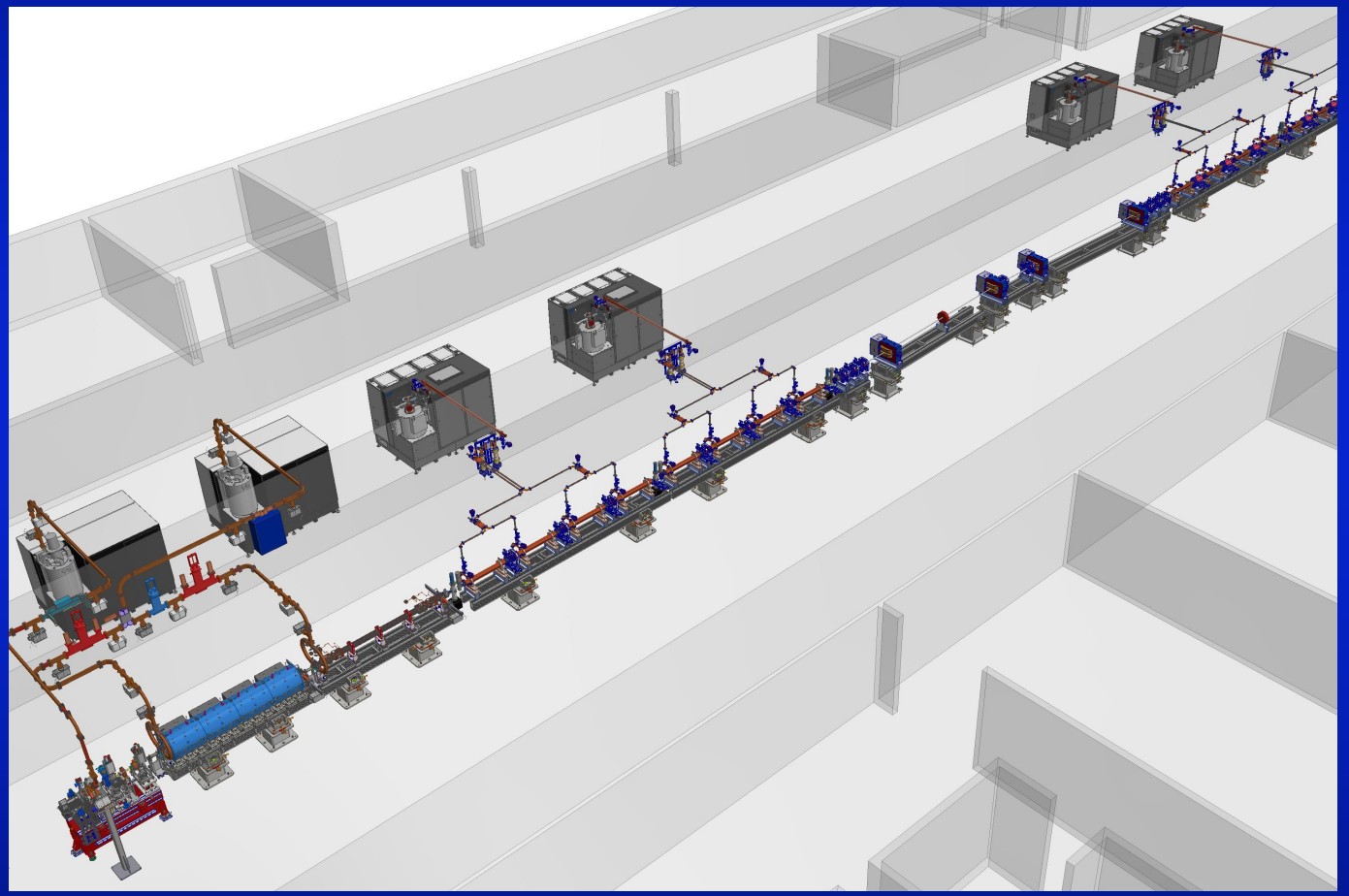
18 X-band accelerating structures 0.9 m long

6 X-Band Klystron and modulator power stations.

2 RF deflectors

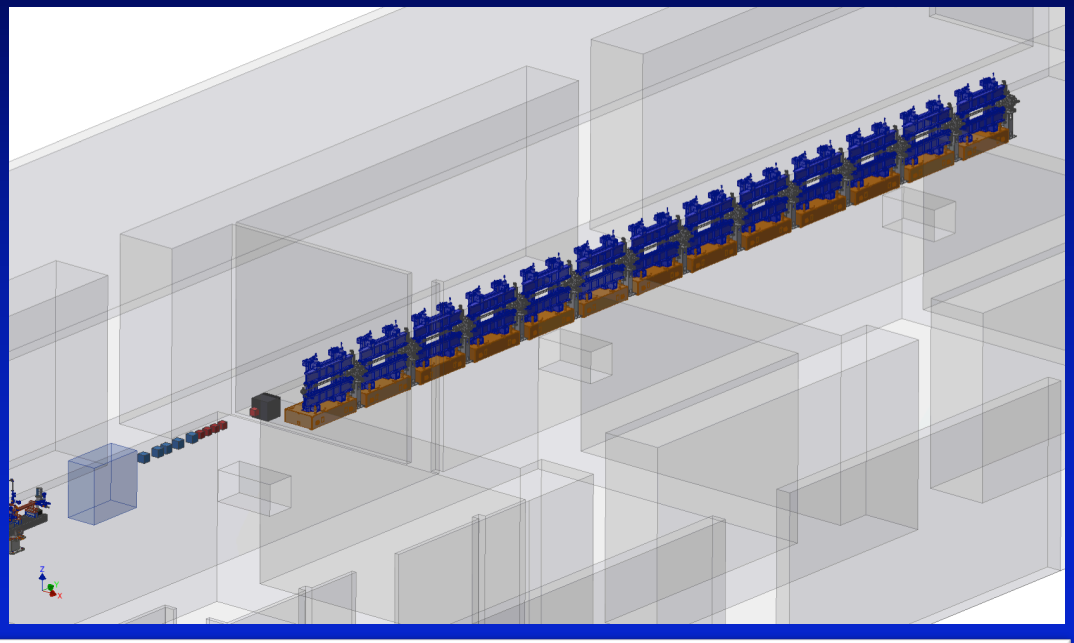
6 RF pulse compressors (BOC)

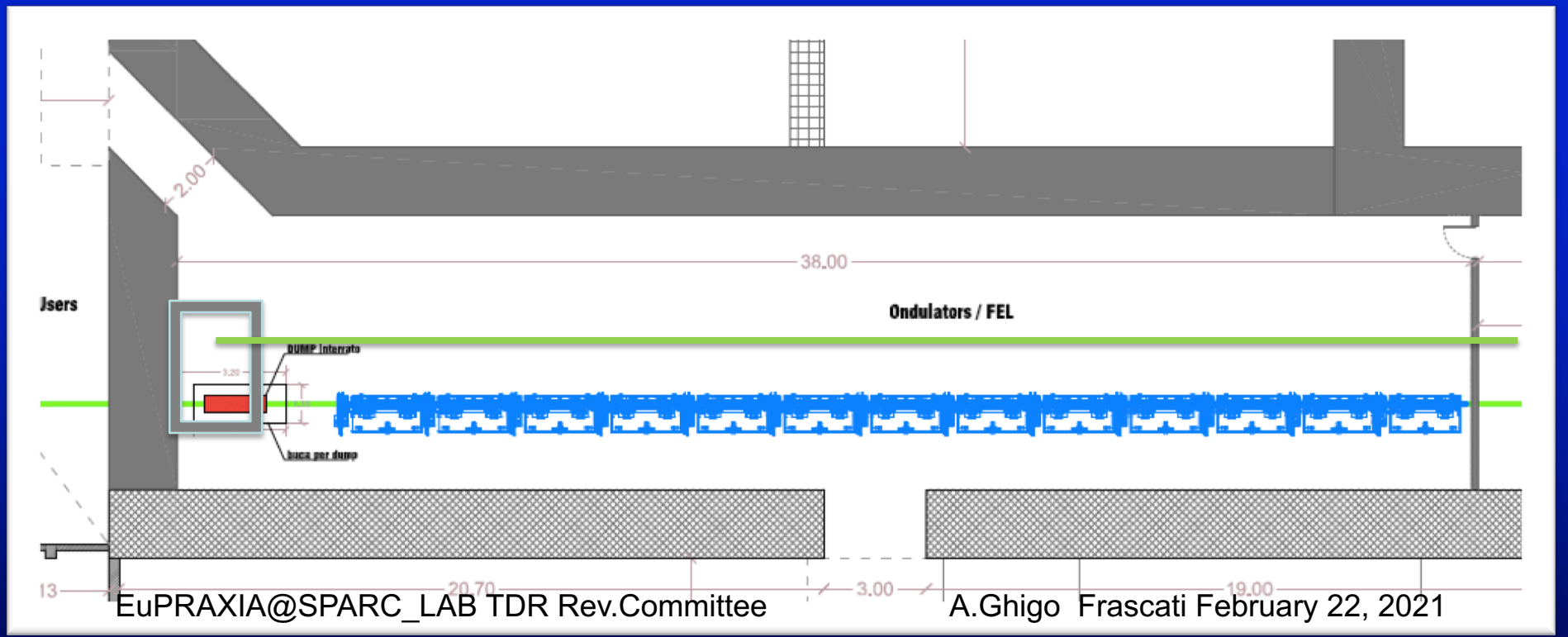
Bunch compressor Magnetic chicane
4 Dipoles
+ quads



Undulators & beam dump studies

- Permanent magnet Undulators & Diagnostics
- 30 m total lenght
- undulator module 2.3 m long
- Combination of SC and NC undulator is under study



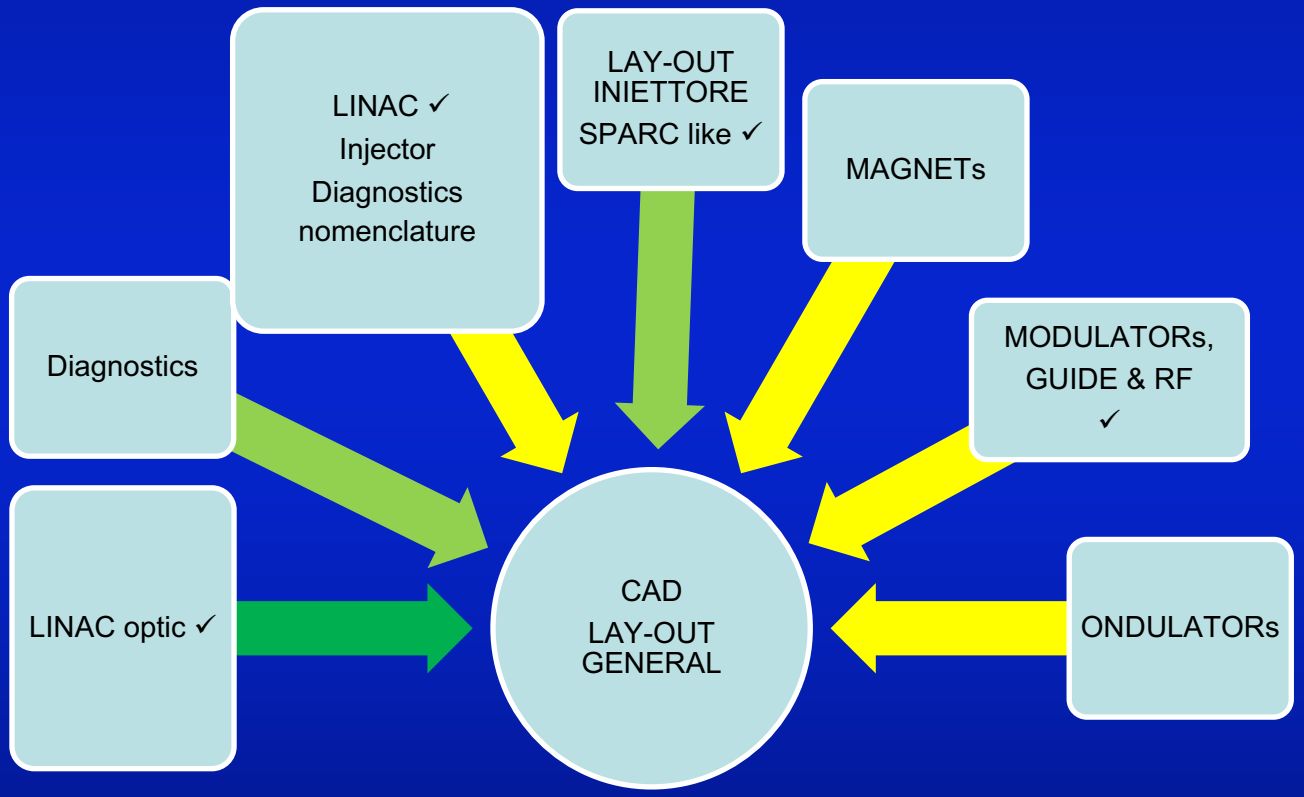


SUMMARY OF THE INTEGRATION STATE: New tools

To do

done

✓ **ready**

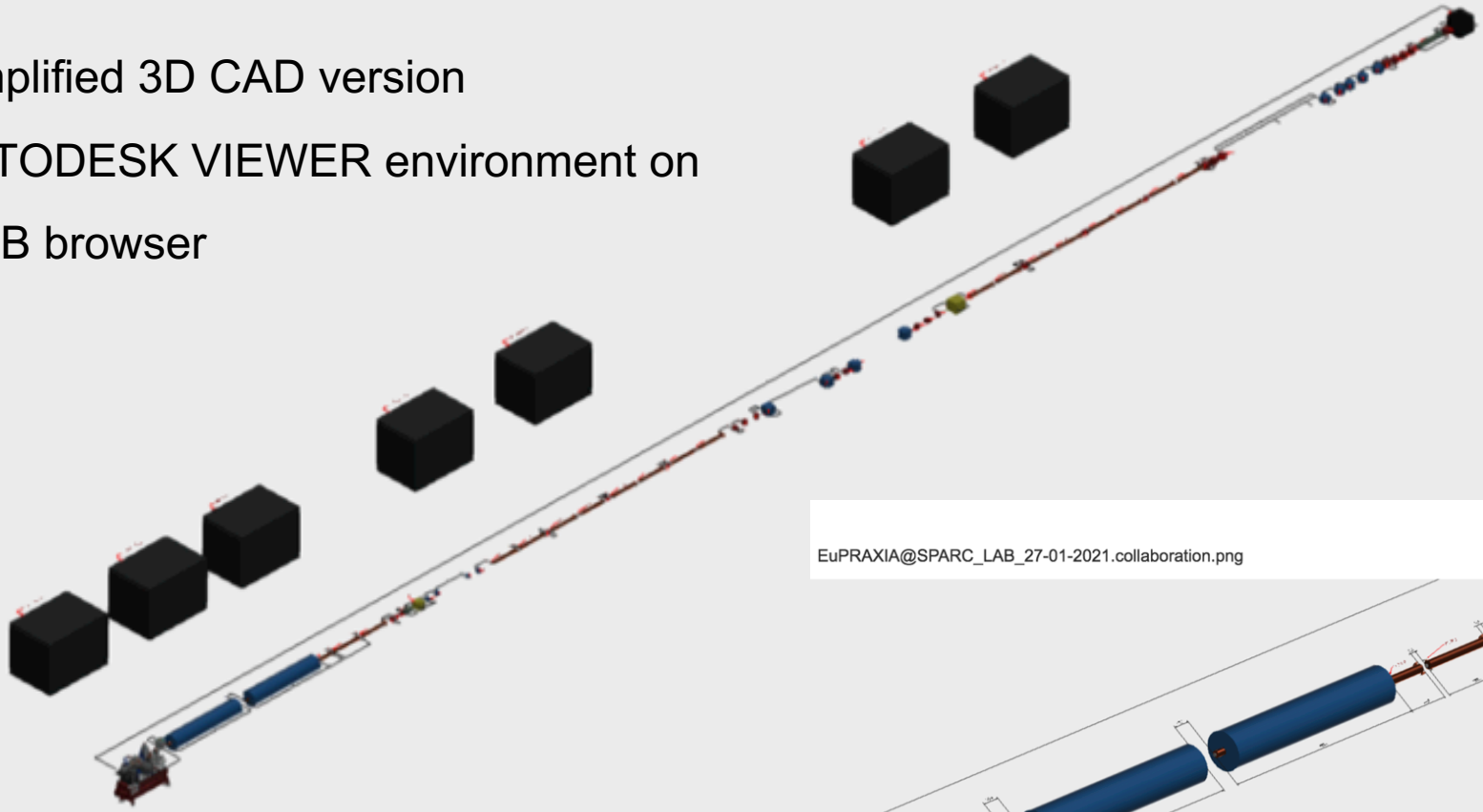


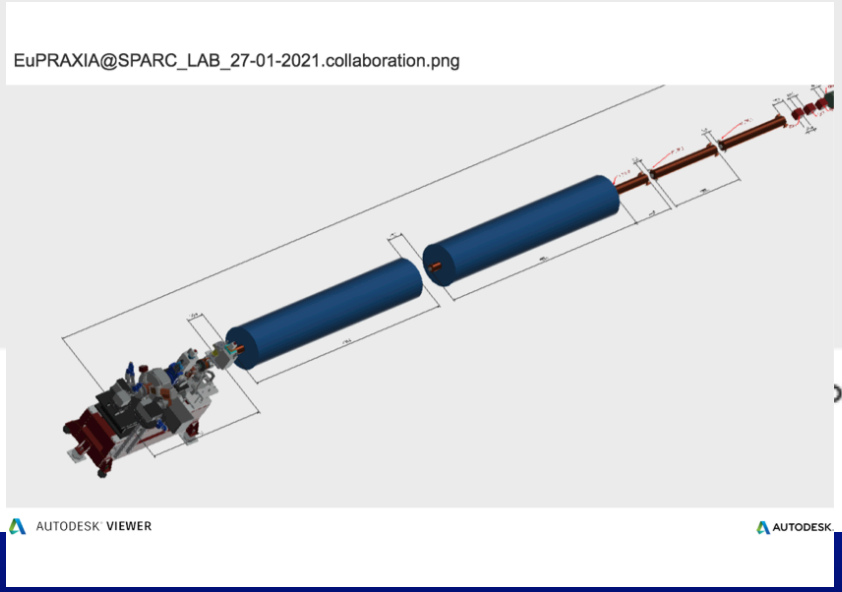
Mechanical implementation tool

Simplified 3D CAD version

AUTODESK VIEWER environment on

WEB browser



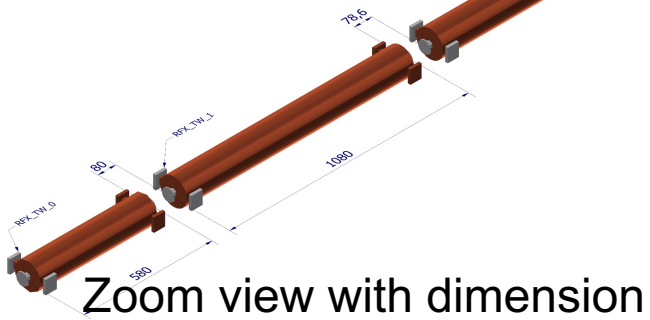


L. PELLEGRINO – E. DI PASQUALE

Lay-out setting

- positions and orientation of elements from file 200pC_1GeV_X_90cm_update_short_LH_4b_up_check_new_Oct_20_flr.xlsx
- dipoles and quadrupoles = cubes with side equal to the magnetic length
- RF sections = full size sketches
- A lay-out definition meeting is being planned: find the status quo of the layout (visible on web browser) at the link https://autode.sk/2XRyIQV
- the updated link is available for collaboration on TEAMS

Possible to take measurements, identify components, etc.



Zoom view with dimension

AUTODESK VIEWER > EuPRAXIA@SPARC_LAB.collaboration

Viste | Browser modello | Proprietà | Impostazioni | Commenti | Stampa

Modello

Cerca

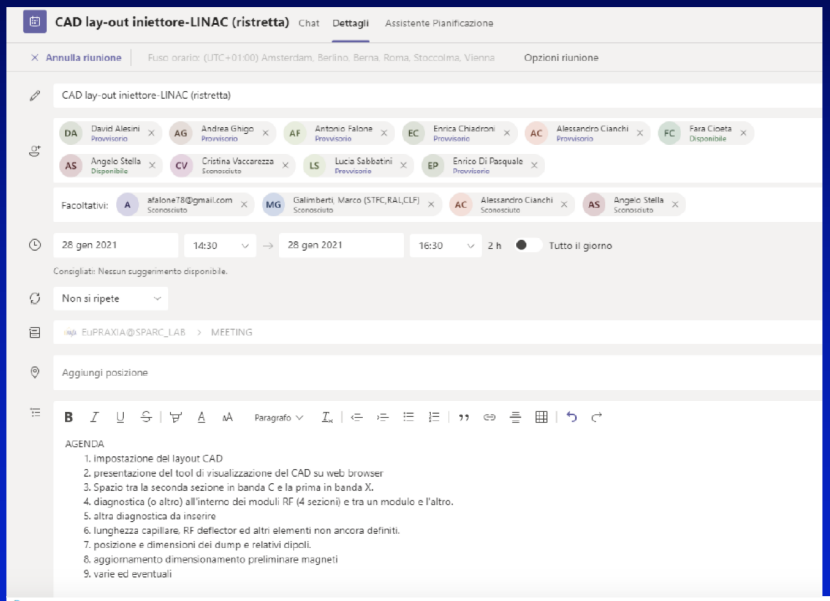
- RFX_TW_4:2 (1)
- RFX_TW_4:3 (1)
- RFX_TW_4:4 (1)
- RFX_TW_0:3 (1)
- QS12:1 (1)
- QS13:1 (1)
- DPSC:1 (1)
- BLH1:1 (1)

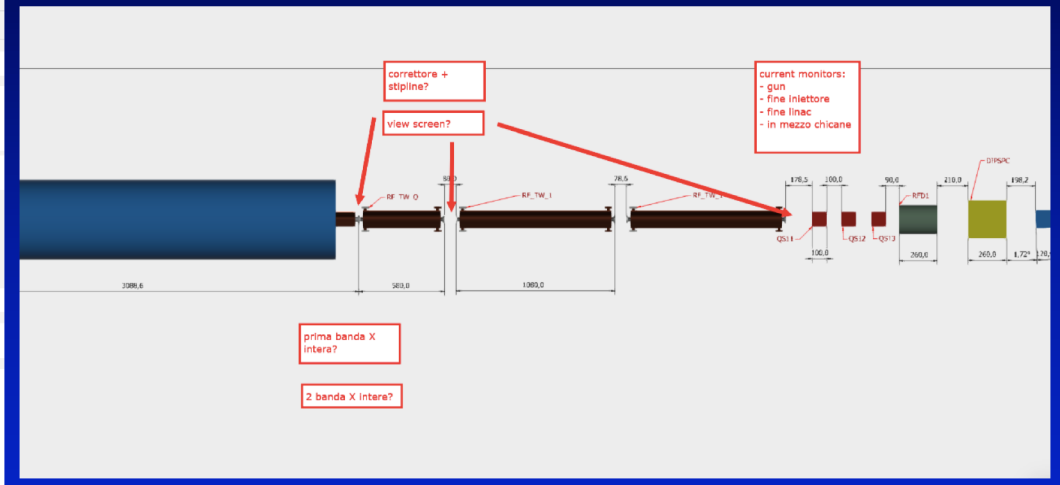
~ 200.0 cm
X ~ 17.5 cm
Y ~ 199.2 cm

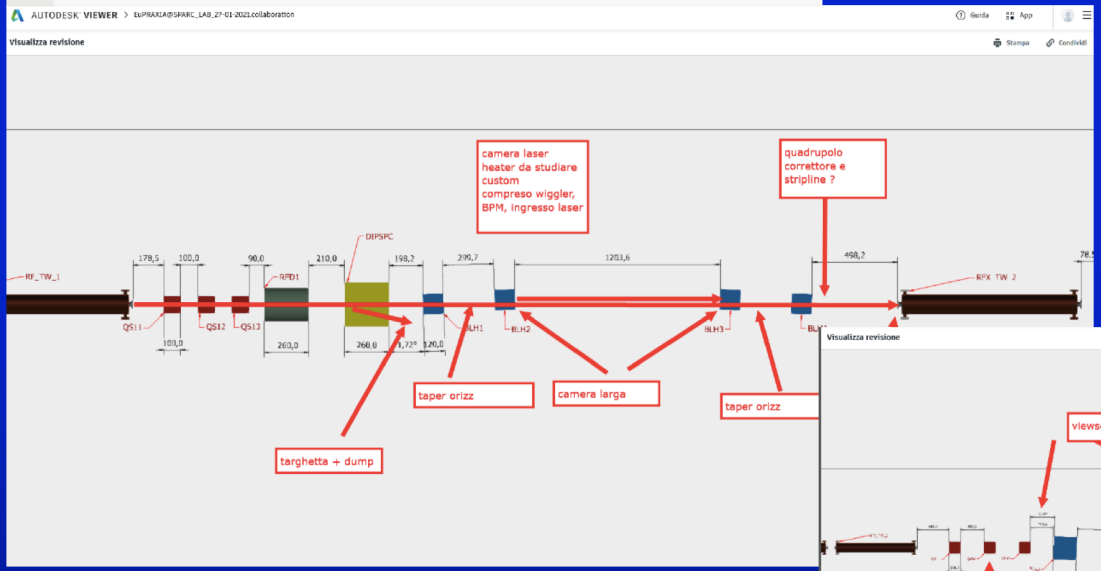
Distanza | Angolo | Calibra | Elimina | Impostazioni | Fatto

New Lay-out setting

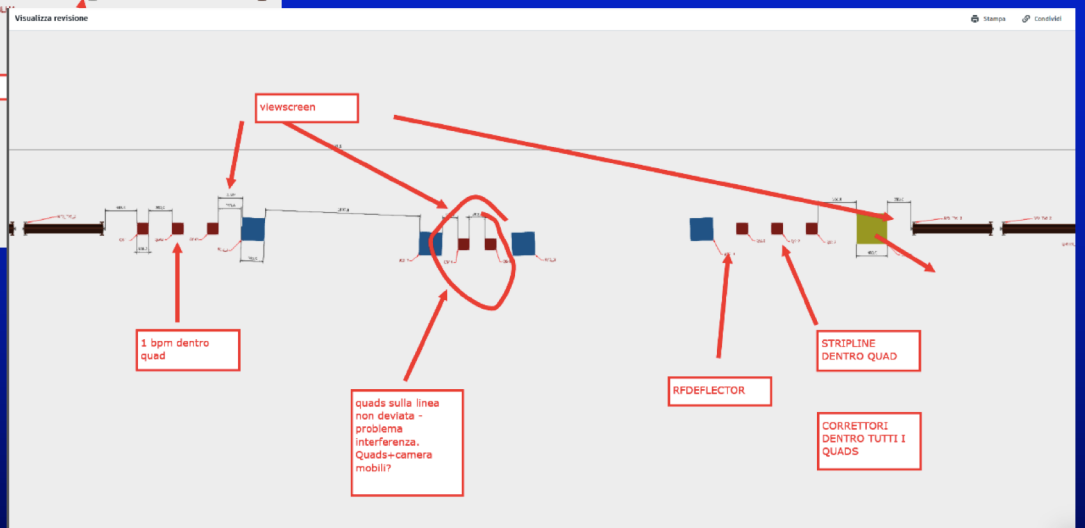
- When available, the 3D CADs will gradually replace the cubes.
- The same general assembly will always be available also in "lightened" view to be able to interact quickly on positions and new components.
- REASONABLE IMMEDIATELY: insert the injector in the "new SPARC-like" status.
- EASY NOW: integration of nomenclature from WBS and application to the automatic numbering of drawings







interact quickly with the design team

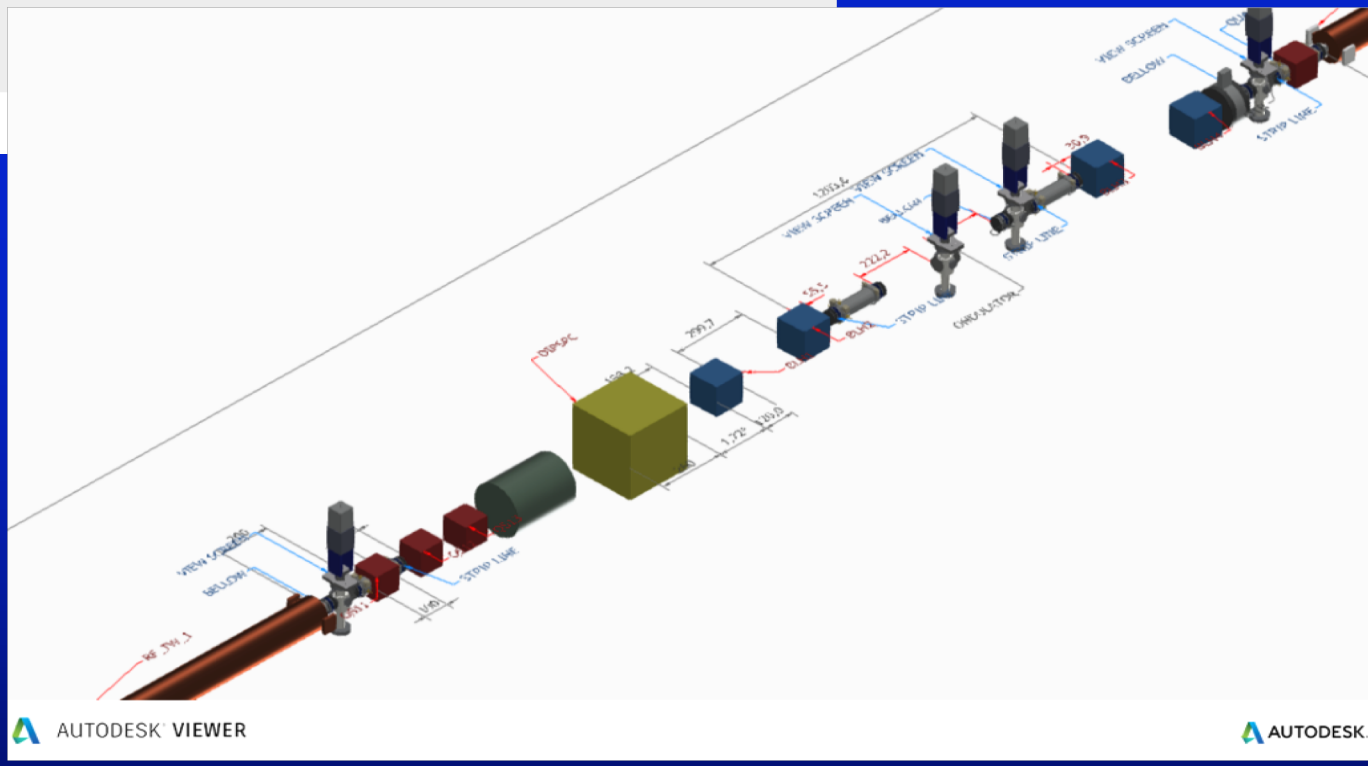


L. PELLEGRINO – E. DI PASQUALE

Layout implementation

Vacuum chambers are still missing

Basic Diagnostics & Vacuum components have been inserted



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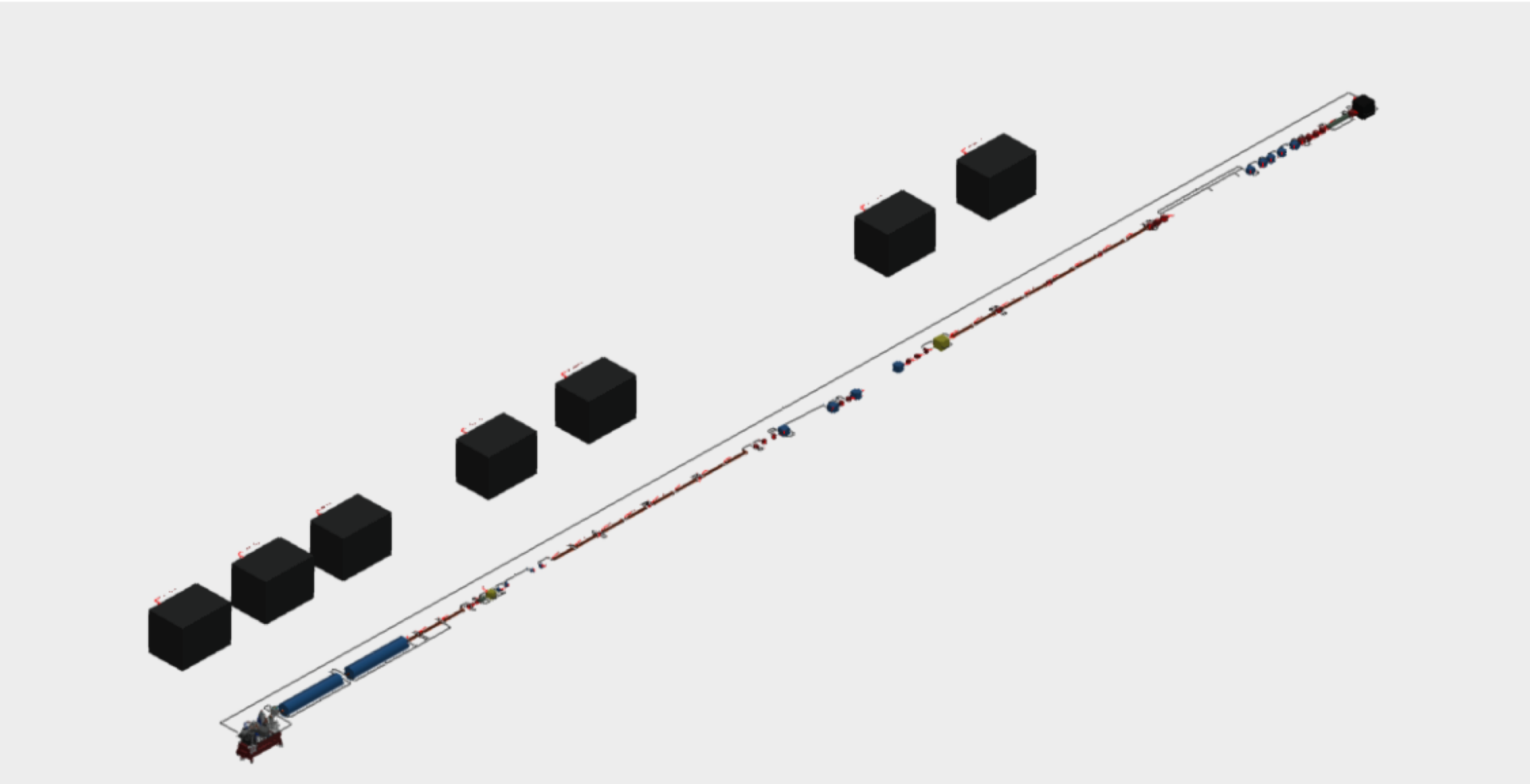
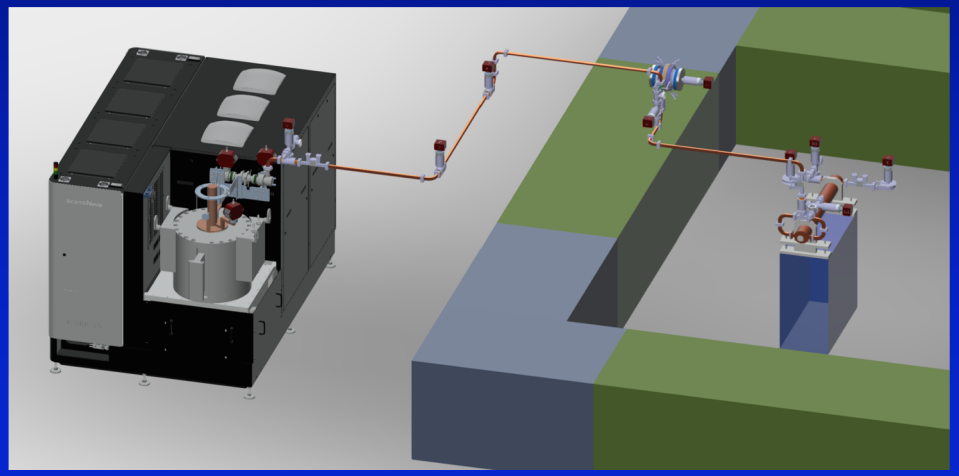


Thanks for the attention

R&D Activities

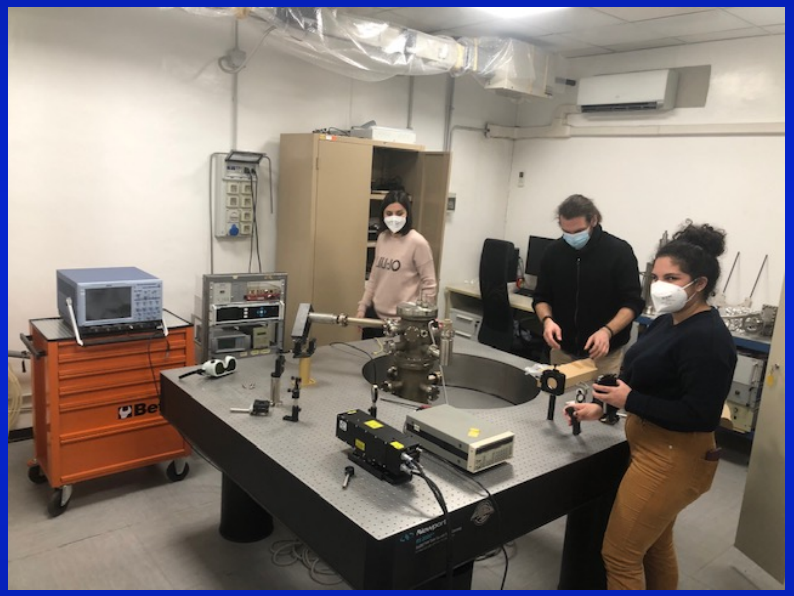
TEX: X-band test stand
EuPraxia/CERN collaboration



S.Pioli

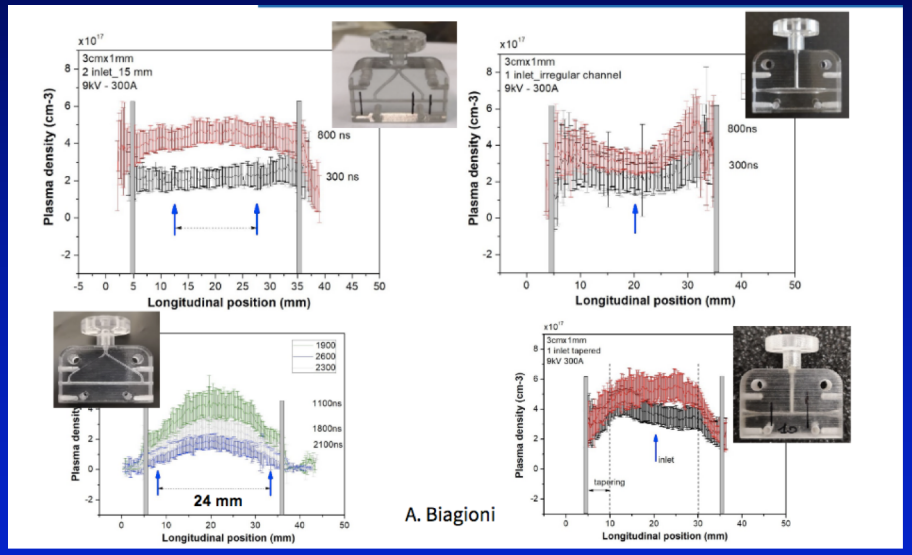
R&D Activities

Cathode-lab



Quantum efficiency measurements of new emitter material

Cathode test



Plasma-lab

New capillary shapes test

Discharge circuit test