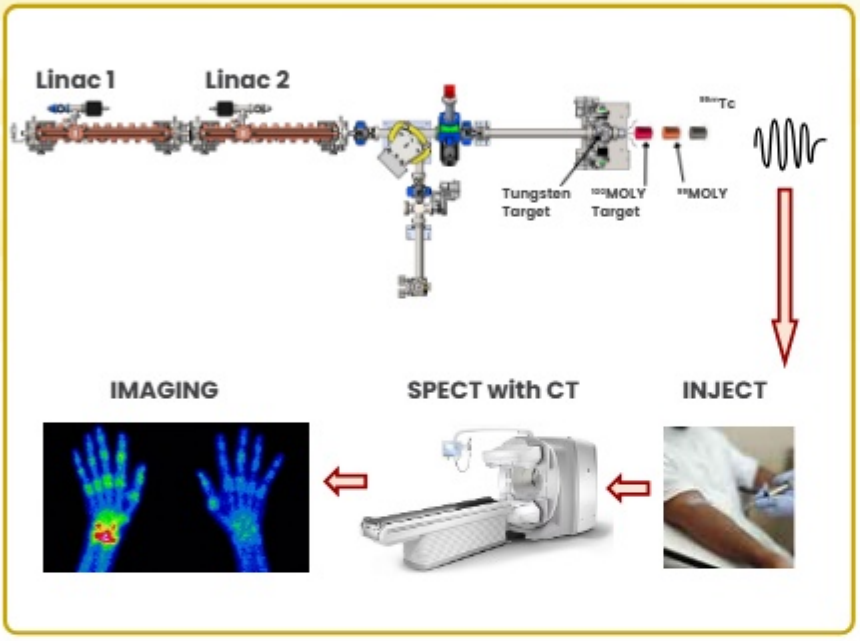
इलेक्ट्रॉनिकी एवं
सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
ELECTRONICS AND
INFORMATION TECHNOLOGY

सत्यमेव जयते

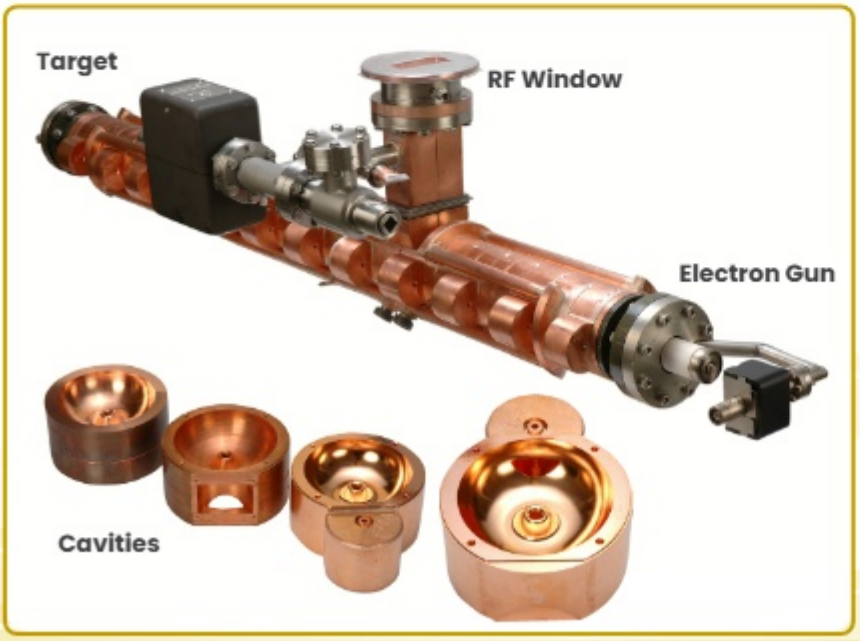
SAMEER

High Energy Linac For Radio Isotope Generation

Clean Technology for Medical Isotope Generation



- Development of High Energy Linac with high power beam for the first time in country
- Two linac in series will be powered by high repetition rate klystrons with solid state modulators to generate up to 30 MeV energy
- Automated target will be inserted to convert electrons to photons
- Secondary target will be ^{100}Mo which will convert to ^{99}Mo via (γ, n) reaction
- ^{99m}Tc will be eluted from ^{99}Mo



Specifications	
Electron Energy	15 to 30 MeV
Average Current	150 to 300 µA
Primary Target	Tungsten and Copper
Secondary Target	^{100}Mo or other targets
Electron Gun	Diode and Triode
RF Source	Klystron with Pulse Modulator
Console	FPGA based computerized console

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Radiation Shielding and Target Loading

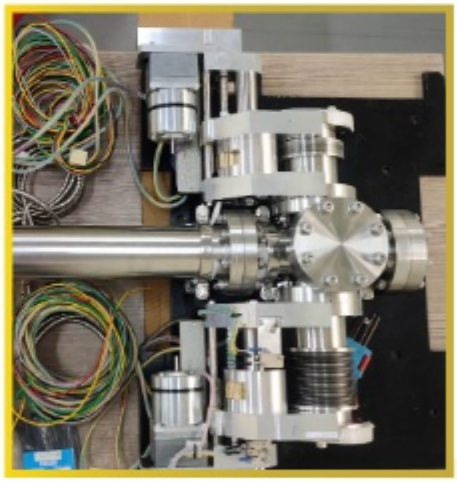
Modular Shielding

- Contents - Lead, High Density Polypropylene (HDPE), Borated-HDPE, Boron rubber
- Movable door for target access
- Leakage < 0.1 %
- Ensures safe radiation environment for operators and other workers in the vicinity



Retractable Target Assembly

- Retractable target for target selection viz. W, Cu, ^{100}Mo
- Remotely controlled target motion
- Low Z exit window
- Option of direct target irradiation with electron beam



Secondary Target Loading

- 6 Degrees of freedom robotic arm
- Maximum pay load 5 kg
- Automated Guided Vehicle (AGV) for remote operated motion
- Speed 25 m/min



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Control & Monitoring System

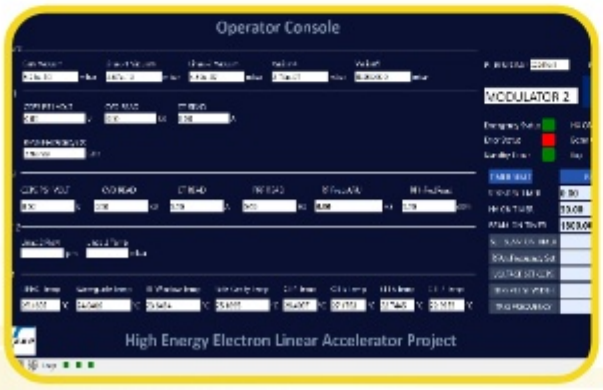
- Interface communication interfaces like MODBUS, TCP/IP, RS485, RS232
- High priority critical systems are handled in Programmable Logic (PL)
- External interfaces are handled using the Proccessing System (PS) over the ethernet
- Various motion based subsystems and power supplies can be controlled & monitored
- All the parameters can be logged and plotted in the User Interface (UI)



Designed and Developed Data Acquisition Card



System on Modules (SOM) using Zynq 7020



UI designed and developed using QTQML



Master Control Display

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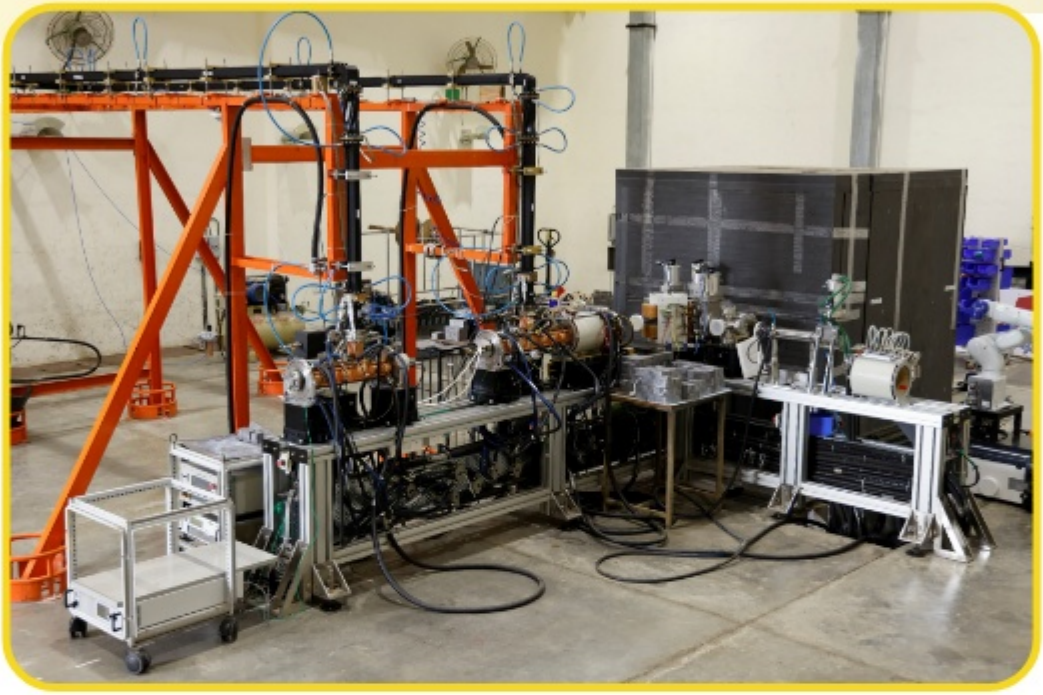
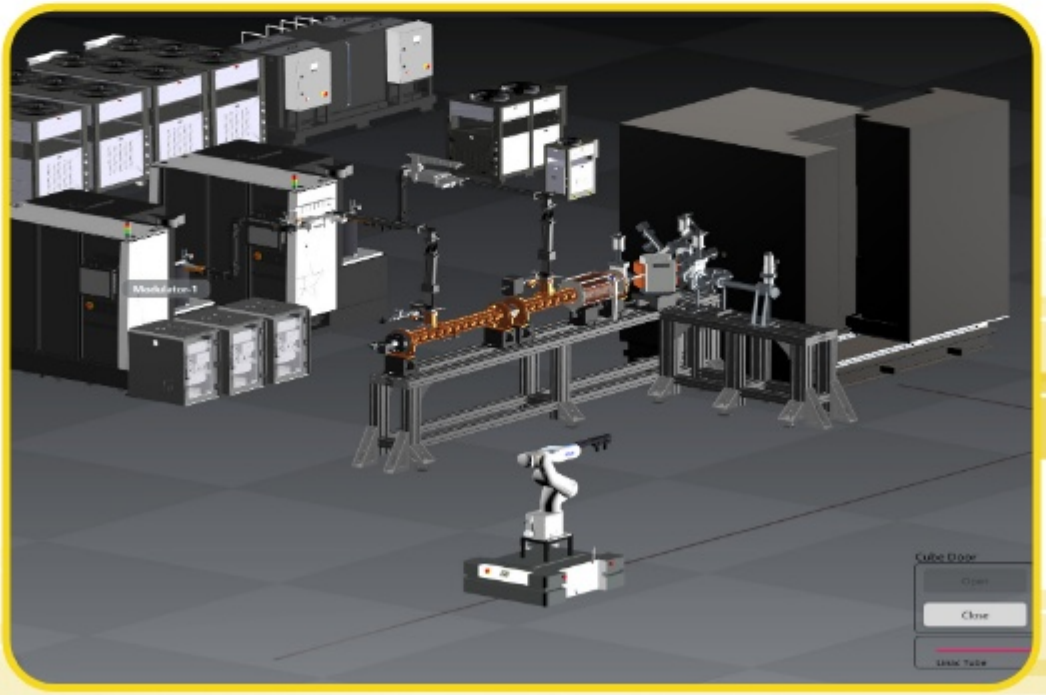
High Energy Linac For Medical Radioisotopes

Beam Line At Navi Mumbai Campus



Pictorial Graphical User Interface (GUI)



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