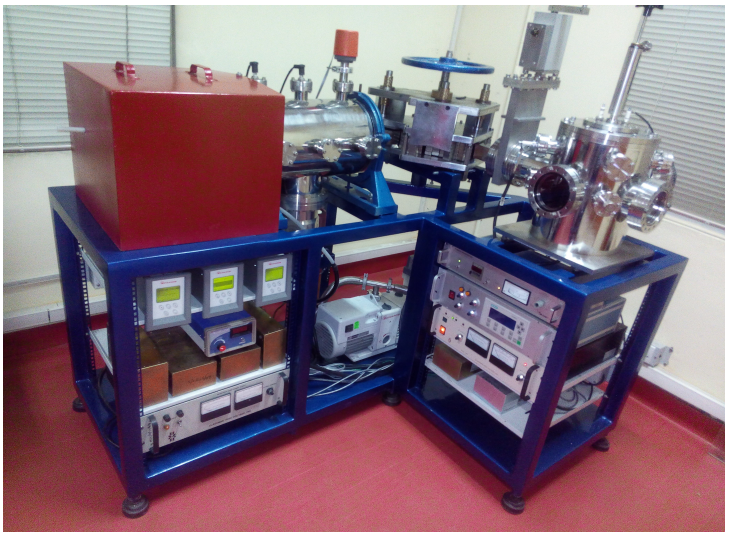
IUAC's 60 kV Tabletop Ion Accelerator

To inculcate the interest of young students towards the Physical Sciences in education & research, IUAC takes the pleasure in announcing the in-house development of 60 kV Ion Accelerator for Physics students & faculty at the University/College level.



Students & Faculty will get hands-on exposure on:

- *Ion source*
- *Bending magnets*
- *Analysed - ion beams*
  - molecular beams
  & neutral beams
  at different energies
- *Vacuum systems*
- *Beam transport*
- *Energy selection*
- *Beam Scanner*
- *Building an Accelerator*

etc.....

The faculty & students can do following experiments using Alpha, Proton & Molecular Hydrogen beams up to 60kV without any radiation hazard within their University/College.

- *Positive Ion implantation*
- *Ion Induced fluorescence studies*
- *Nano patterning on surface*
- *Low energy irradiation induced effects*
- *Surface nitradation*
- *Particle detector experiments*
- *Scattering experiments*
- *Production of neutral atomic species etc.....*

Beam Energy Range
with R=250 mm, Field: 1100 – 2600 G

Element	Mass	Energy Range (keV)
H^+	1	35 - 60
H_2^+	2	25 – 60
He^+	4	25 – 50
He^{2+}	4	50 – 120

Machine Highlights

Design – Simple & rugged design. Can be assembled on site for learning.

Utility – Need only 1 kVA, 240 V electric power.

Space – Need only 3X3 mtrs room.

Physical Size – 1.6m X 1.4m X 1.5m (WXHXD)

Inter-University Accelerator Centre

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Sub- systems of the Ion Accelerator

Penning Ion Generator (PIG) Ion Source

Cold plasma based PIG ion source is designed, developed and used with IUAC's 60 kV ion accelerator. The ion source is capable to deliver 300 micro amp stable current. The ion source is assembled in nylon housing and connected to 60 kV power supply. Anode power supply of 3 kV for the source is converted from main 60 kV power supply. The required gas is supplied through needle valve mounted at high voltage devider.

Ion Source Assembly

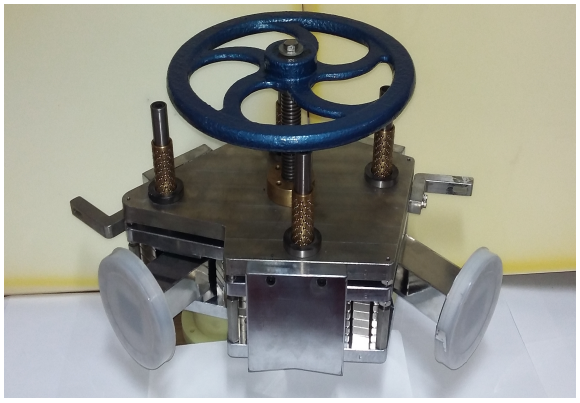
Electrostatic Quadrupole Triplet

Quadrupole Inner Assembly

An electrostatic quadrupole triplet has been designed and fabricated for use in above accelerator. It has stainless steel vacuum jacket of 250 mm diameter with 9 ports of 2.75" CF ports for power supply & 8" OD CF port for mounting 400 LPM turbo molecular pump. It has 60 mm aperture & poles of 100, 185, 100 mm long with 56 mm radius made out of aluminium.

Permanent Magnet Based Bending Magnet

A bending magnet has been assembled by using pallets of permanent magnet to get a stable variable field of 1100-2600 Gauss as required for accelerator. The magnet has been assembled using two 20 mm thick rectangular MS plates acting as poles. The common hand wheel is used for movement of plate holding the vertical shorting plates.



Bending Magnet Assembly