



IUAC's 30 kV Tabletop Ion Accelerator

To inculcate the interest of young faculties & students towards the Physical Sciences in education & research, Inter-University Accelerator Centre (IUAC), New Delhi India, takes the pleasure in announcing the in-house development of 30 kV Ion Accelerator for Physics students & faculty at the University/College level.

Having this accelerator one will get hands-on exposure on:

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

The faculty & students can do following experiments using ion beams up to 30kV 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		
Element	Mass	Energy Range (keV)
C ⁺	12	11 – 27
N ⁺	14	10 – 26
O ⁺	16	8 – 23
F ⁺	19	7 – 19
Ne ⁺	20	6.5 – 18
S ⁺	32	4 – 12
Cl ⁺	35	3.8– 11
Ar ⁺	40	3.5 – 10

Machine Highlights

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

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

Space – Needs only 2X2 mtrs room.

Physical Size – 0.58m X 1.1m X 1.8m (WXDXH)

Inter-University Accelerator Centre

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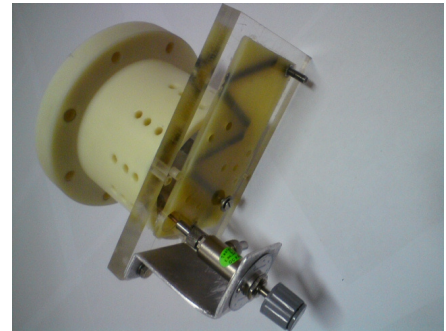
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Sub- systems of 30 kV Tabletop Accelerator

Penning Ion Generator (PIG) Ion Source

Cold plasma based PIG ion source is designed, developed and used with IUAC's 30 kV ion accelerator. The ion source is capable delivering upto 350 micro amp stable current. The ion source is assembled in a nylon housing and connected to a 30 kV power supply.

Anode power voltage of 2.5 kV for the source is derived from the main 30 kV power supply. The required gas is supplied through a needle valve mounted at the high voltage divider.



Ion Source Assembly

Einzel Lens with Electrostatic Quadrupole

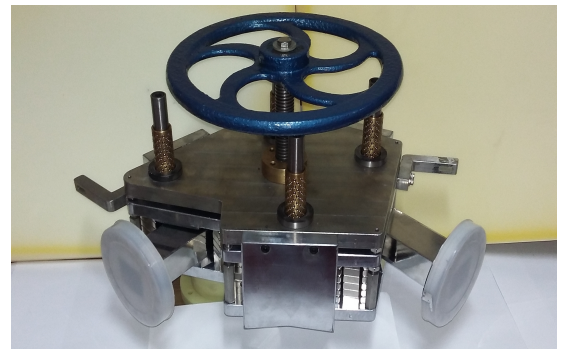


An einzel lens along with an electrostatic quadrupole has been designed and fabricated for use in the above accelerator. It has a stainless steel vacuum jacket of 200 mm diameter with 4 ports of 2.75" CF ports for power supply & 6" OD CF port for mounting a 300 LPM turbo molecular pump.

Einzel with Quadrupole Inner Assembly

Permanent Magnet Based Bending Magnet

A bending magnet has been assembled by using pallets of permanent magnets to get a uniform, variable field of 2100 - 3500 Gauss as required for the accelerator. The magnet has been assembled using two 25 mm thick MS plates acting as poles. A common hand wheel is used for movement of a plate holding the vertical shorting plates for shunting the field.



Bending Magnet Assembly