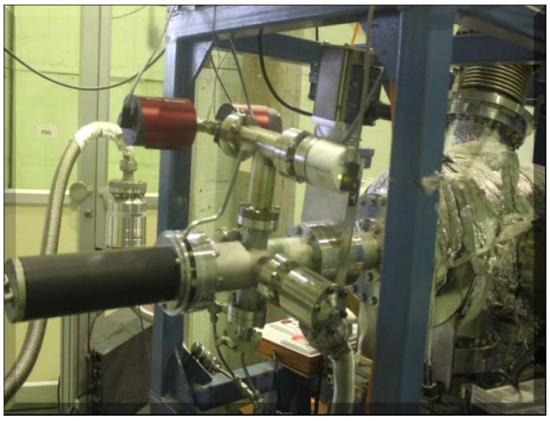
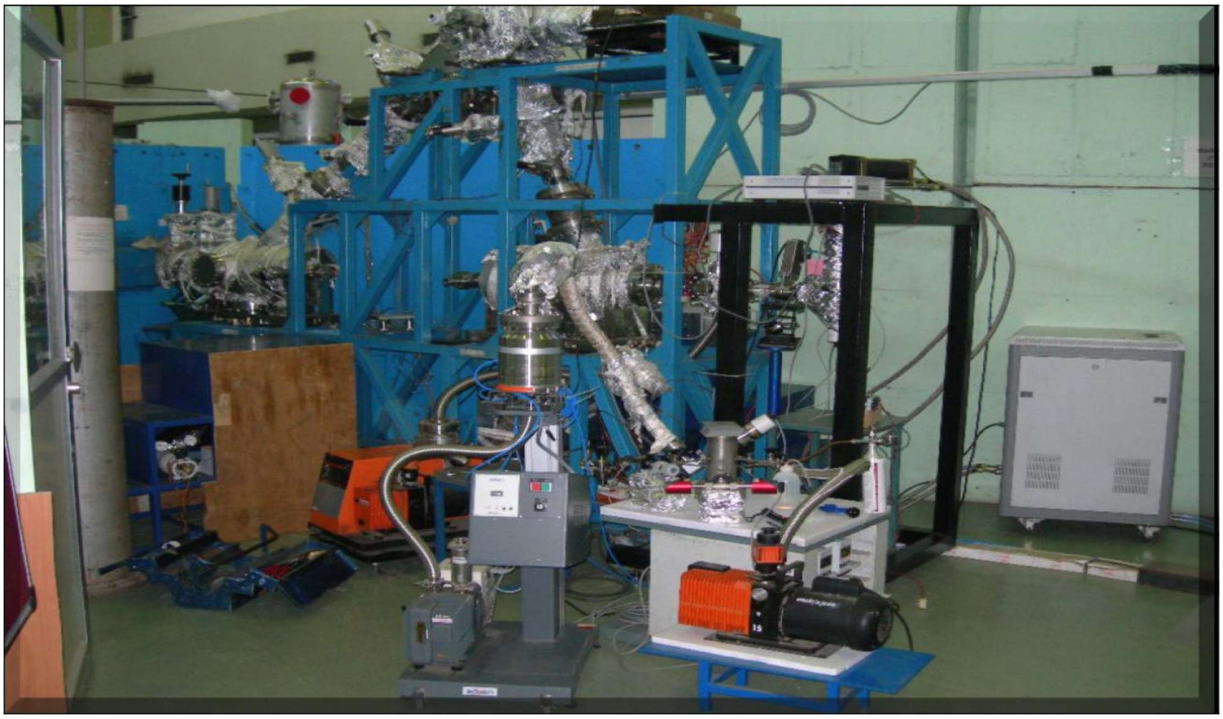
Details of Photophysics beamline:

Beamline Acceptance	41 mrad (H) × 5.6 mrad (V)
First Mirror (M_1)	Toroidal mirror (Gold coated) to focus the SR beam on the entrance slit of the monochromator
Monochromator	1-m Seya-Namioka monochromator with gold coated spherical grating (2400 g/mm).
Second Mirror (M_2)	Toroidal mirror (gold coated) to refocus the beam to a sample at a distance of one meter
Spot size	1mm (H)×1mm (V) (Solid samples)
Photon flux	10^8 Photons/sec (Typical)
Wavelength Range	500 – 3500 Å (for solids); 1100 – 3500 Å (for gas phase)
Detection	Sodium salicylate coated window with VUV to visible sensitive photomultiplier.



Photograph of gas cell



Photograph of Photophysics beamline at Indus-1

Consolidated update of some of the research work carried out in the last five years:

Experimental programs carried out in the last five years on photophysics beamline include VUV spectroscopy of polyatomic molecules in gas and solid phase, optical properties of irradiated photonic and radiation detector materials. A few representative scientific issues addressed in the study of electronic spectroscopy of molecules are:

- ***Electronic excitations up to and beyond the first ionization potential***
- ***Change in geometry and vibrational frequencies of excited states***
- ***Valence/Rydberg nature of excited states and assignment of Rydberg series using quantum defect analysis***
- ***Assignment of vibrational progressions arising from fundamental/combination modes accompanying the valence /Rydberg transitions including hot band contributions arising from low lying vibrational/ torsional modes***
- ***Study of vibronic coupling, charge transfer excitations and Renner-Teller effects***
- ***Comparative studies of excited electronic state structure in isotopically substituted, iso-electronic and substituent molecules***

Studies carried out using Photophysics beamline during 2015 - 2020

Potential application	Systems studied
Environmental Sciences	*Nitrobenzene; crotanaldehyde; metacrolein*
Astro-chemistry	*Carbon disulphide; Ammonia ; Benzonitrile (Largest aromatic molecule found till date in Inter stellar Medium)*
Medical Applications	*n-pentane; iso-pentane ; carbon disulfide*
Solvents (Industrial/biological/nuclear/ Green)	*Dimethylformamide; Ethyl bromide; Dimethylacetamide; primary alcohols and their isomers, Methacrolein, Crotonaldehyde; carbonyl green solvents (Dimethyl carbonate; Diethyl carbonate; Methyl ethyl carbonate) dimethyl ether; Anisole (fluorescence tracer); tetramethylsilane*
Infra red optical windows	*Optical characterization of sodium chloride Single crystals*
Radiation detector materials	*Optical characterization of triglycine sulphate crystals to study the effect of high energy particle/ radiation on detection efficiency*
Lithium fluoride implanted with H, Li and F ions	*Study of particle/high energy photon induced defects to understand the physics behind the radiation induced effects*