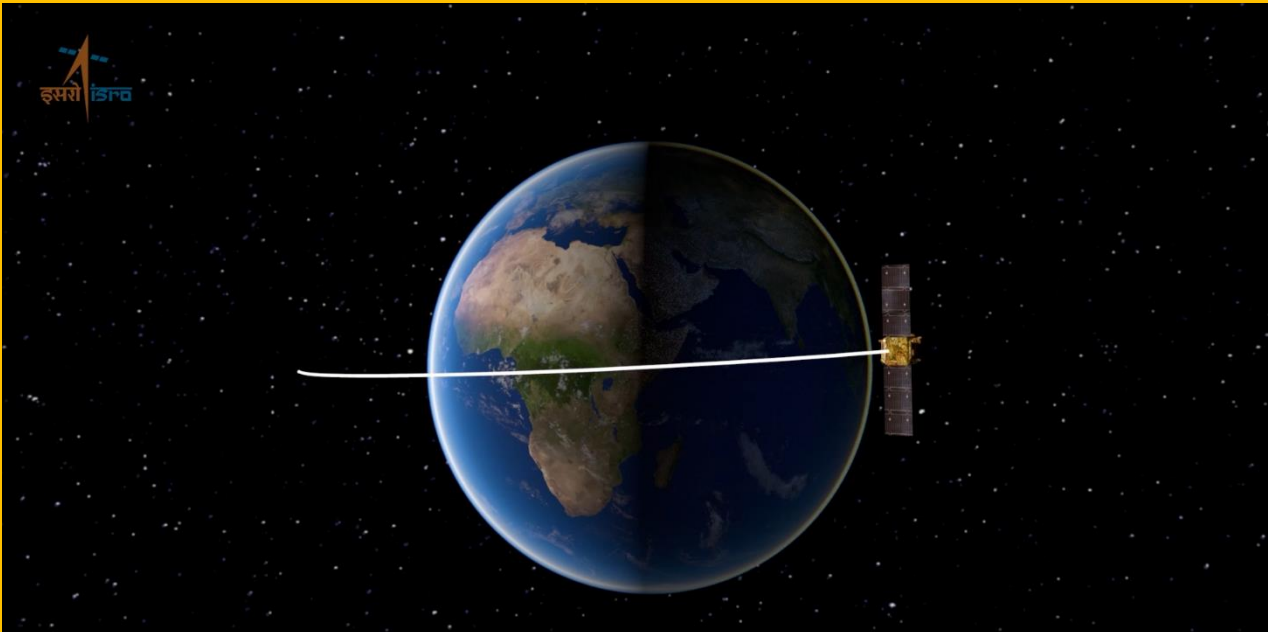
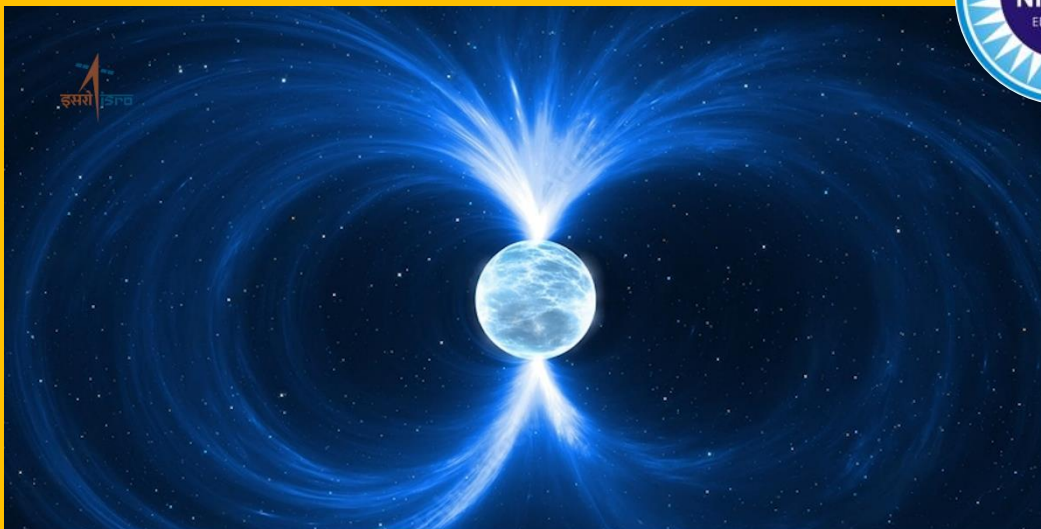


# XPOSAT

ISRO's Blackhole Hunter



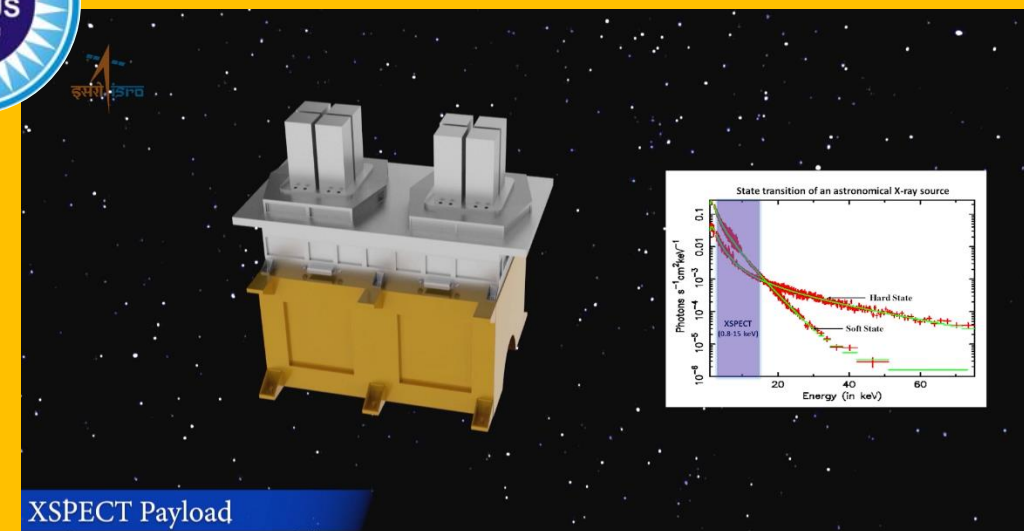
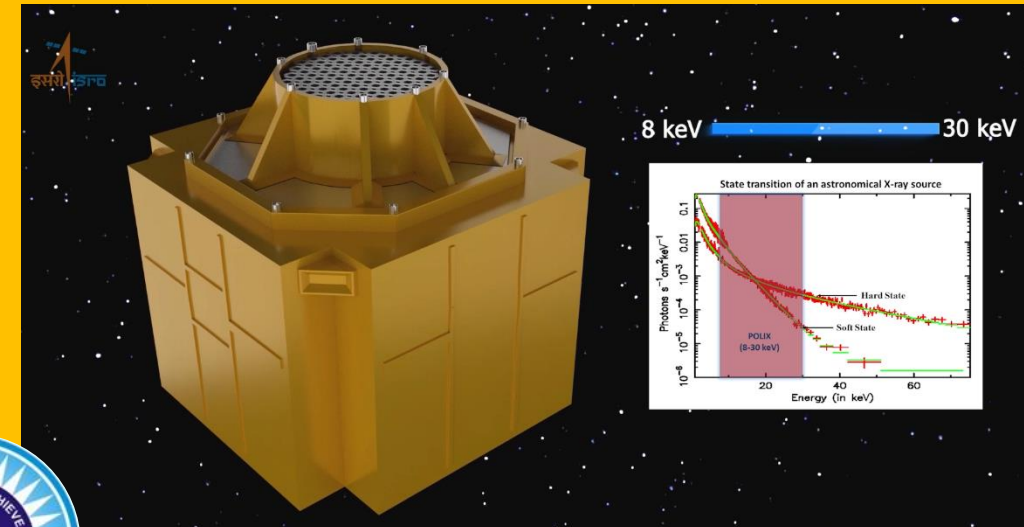
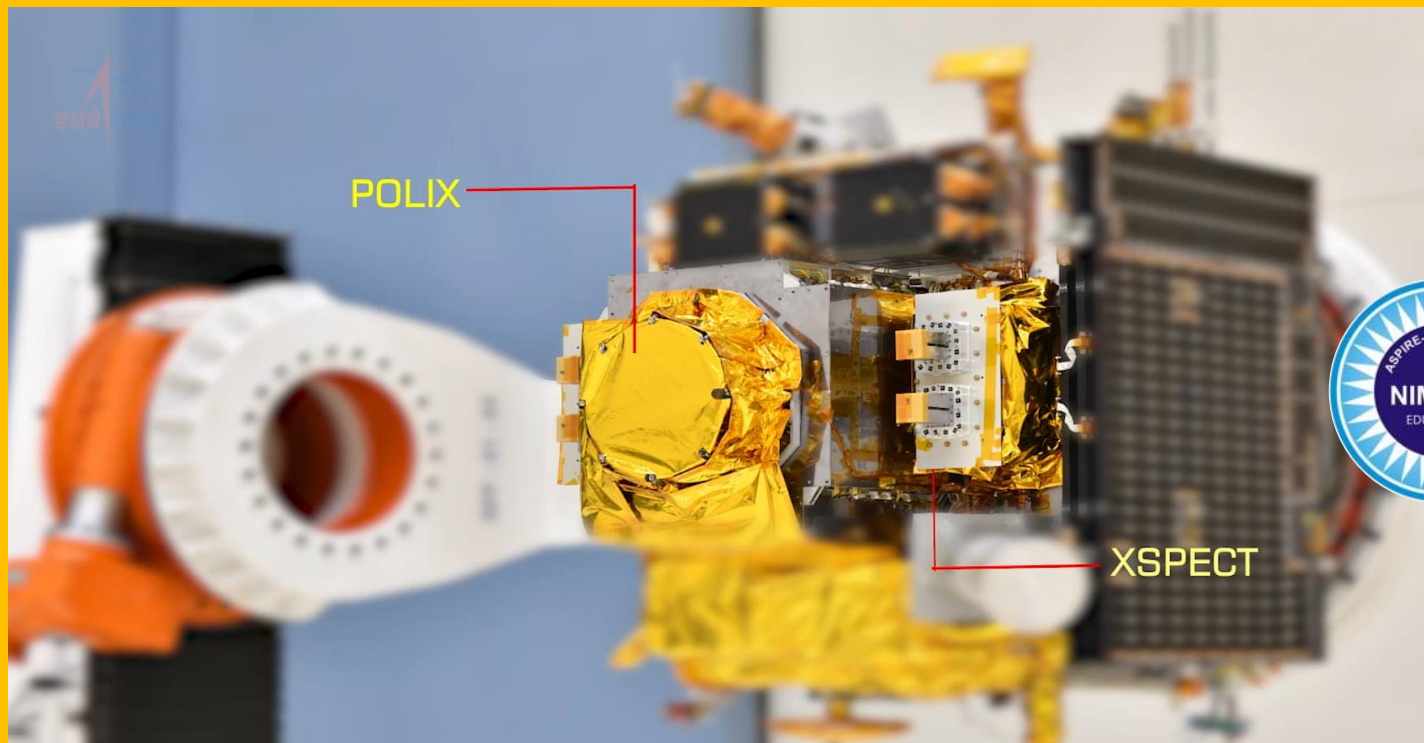
**Only mission after NASA's IXPE that will study the polarization of Electromagnetic radiation coming from massive astronomical entities such as Black Hole, Quasars, Active Galactic Nuclei**

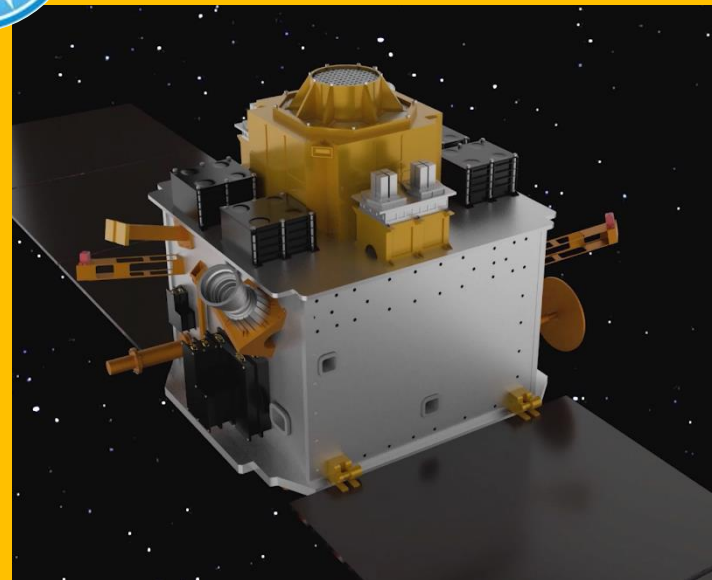
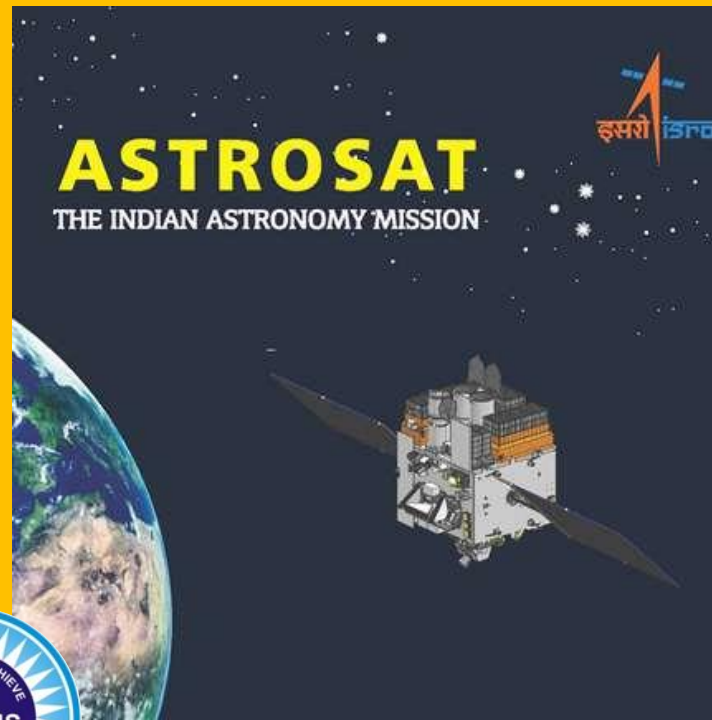
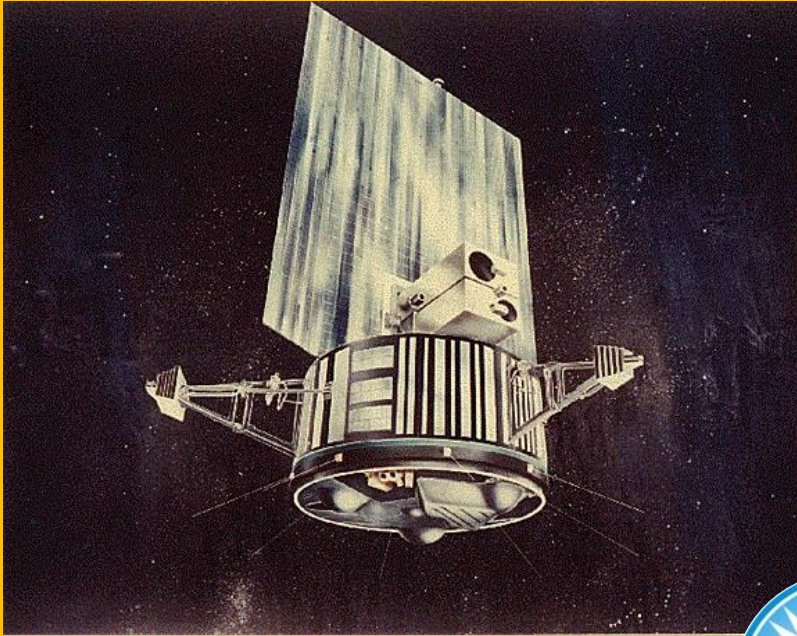


This mission carries 2 payloads POLIX (developed by Raman Research Institute) and XPECT (by URSC)

Polarization of X-ray is relatively unexplored field of high energy Astrophysics.

Study of X ray polarization was done in 1976 for CRAB Nebula and recently by Astrosat

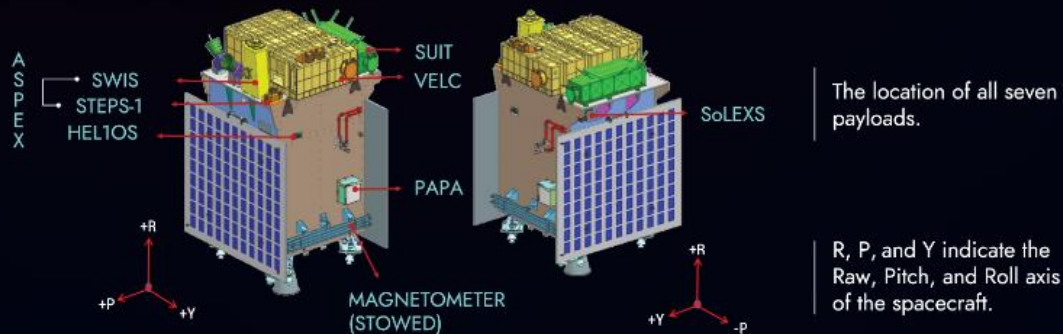
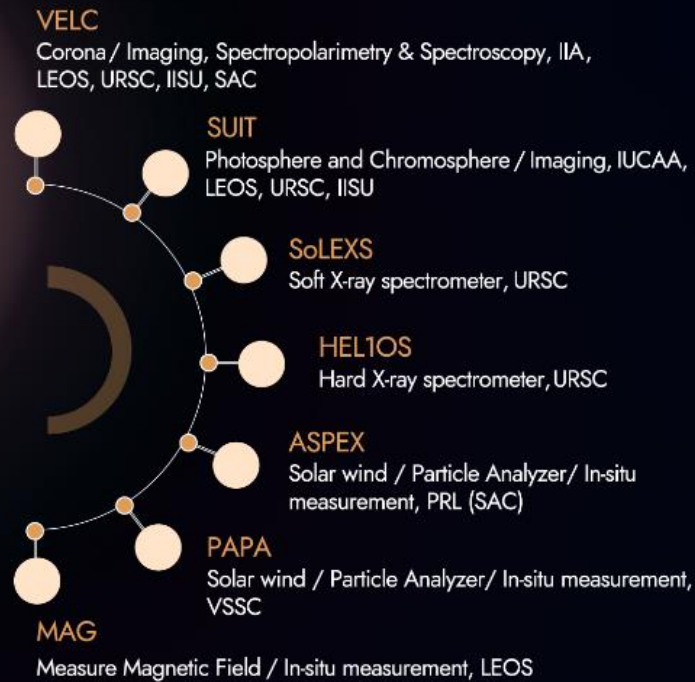




- Different methods for studying X ray polarisations are
  - Bragg Reflection (NASA OSO-8 : **Launched 1975**)
  - Compton Scattering (Astrosat : **Launched 2015**)
  - Photo-electron Polarimeter (NASA IXPE : **Launched 2021**)
- **Thomson Scattering (Xposat)** These studies can be done in different energy ranges
  - Bragg reflection:  $< 3$  keV
  - Photo-electron track: 2-8 keV (NASA IXPE)
  - **Thomson scattering: 5-30 keV (Xposat)** Compton scattering:  $> 30$  KeV (Astrosat)
- From the above point we can say that ISRO's XPOSAT will fill the gap in the information different missions have been collecting till now

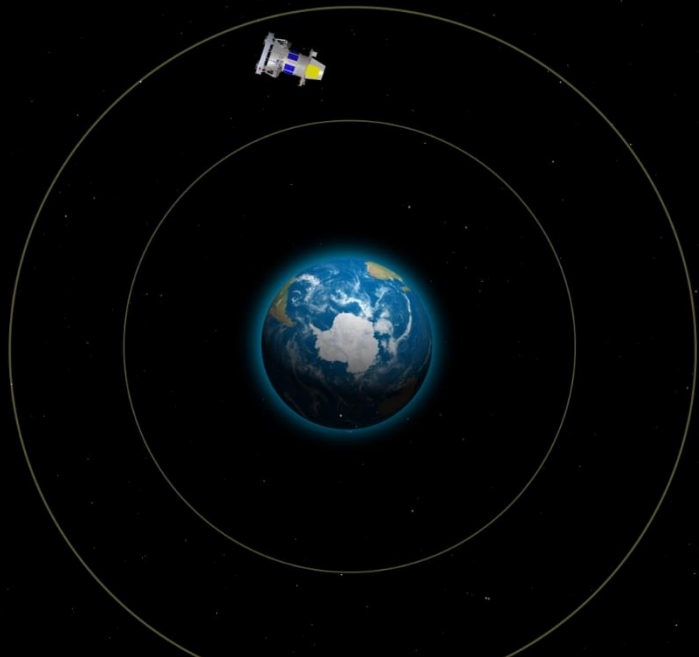
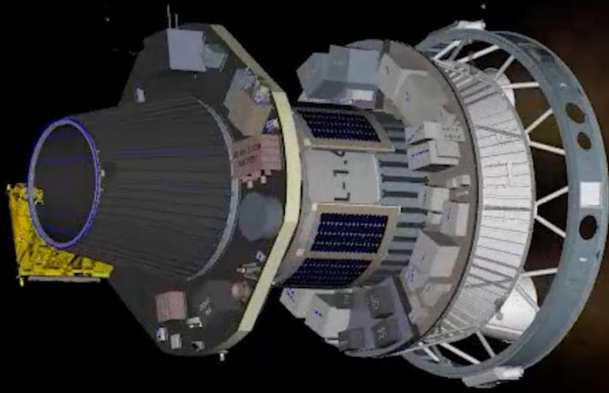
## PAYLOADS

The spacecraft carries seven scientific payloads for systematic study of the Sun. All payloads are indigenously developed in collaboration with various ISRO Centres and Scientific Institutes.

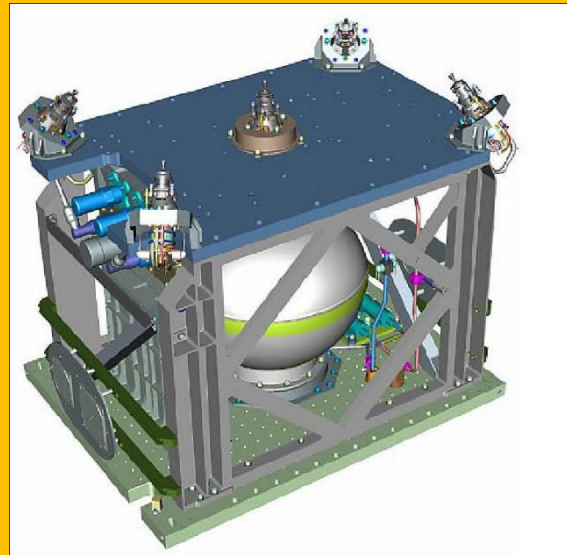
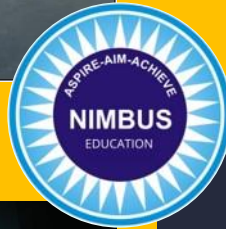


- With this ISRO is sending a clear message to the Scientific Community about the readiness to launch purely scientific missions to explore the unexplored.
- Providing a broader platform for the academia to contribute to the country's Space Exploration Dreams and to play a vital role
- Such missions of ISRO will also give a big boost to the field of research and development in the academic institutions
- As in the Case of Aditya Mission

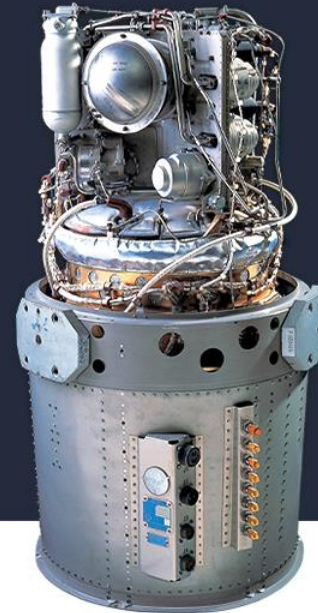
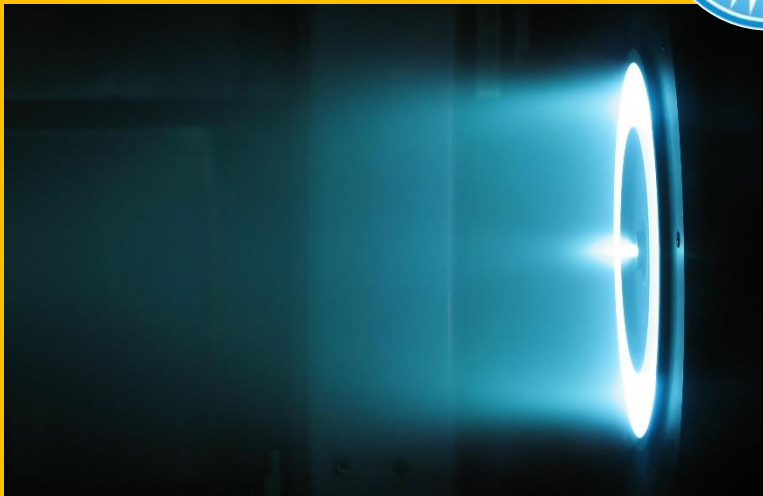




- In the 1st Jan launch of PSLV, after injection of XPOSAT in the respective orbit, the 4th stage of PSLV will be re-started twice to reduce the orbit into 350 km for Orbital Platform (OP) experiments.
- The PSLV Orbital Experimental Module-3 (POEM-3) experiment will be executed for 10 identified payloads
- The left out propellant in the 4th Stage will be disposed through the Main engines as safety precaution for atmosphere re-entry experiments planned in future



- Payloads on POEM payload will test many new technologies such as
  - CubeSat propulsion (propulsion system for very small satellite 10cm X 10cm X 10cm)
  - Green Monopropellant Thruster (for Future Missions)
  - Hall thrusters (Electric Propulsion)
  - Fuel Cell Demonstration (Gaganyaan / Bhartiya Antriksh Station) and others



### The Fuel Cell in Apollo 11

Size	111.8 X 55.9 cm
Weight	181.4kg
Cell output	2,300W max

- Each of the fuel cell power plants contain 31 separate cells connected in series
- Each cell produces 27 to 31 volts.

\* Source : PowerNational Air and Space Museum