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## Research Groups & Projects

### Experimental Astrophysics

Ground Based Radio Astronomy Station IAP-SWRDA  
Meteorological Satellite Project IAP-SAT  
Space Infrared Sensor for IAP-SAT (IAP-SAT\_IRS)

### Theoretical Astrophysics

Models for Pulsars, Supernovae, and Interstellar Media Processes

**Publications 2010 – 2018** Full texts on <http://aecenar.com/publications>

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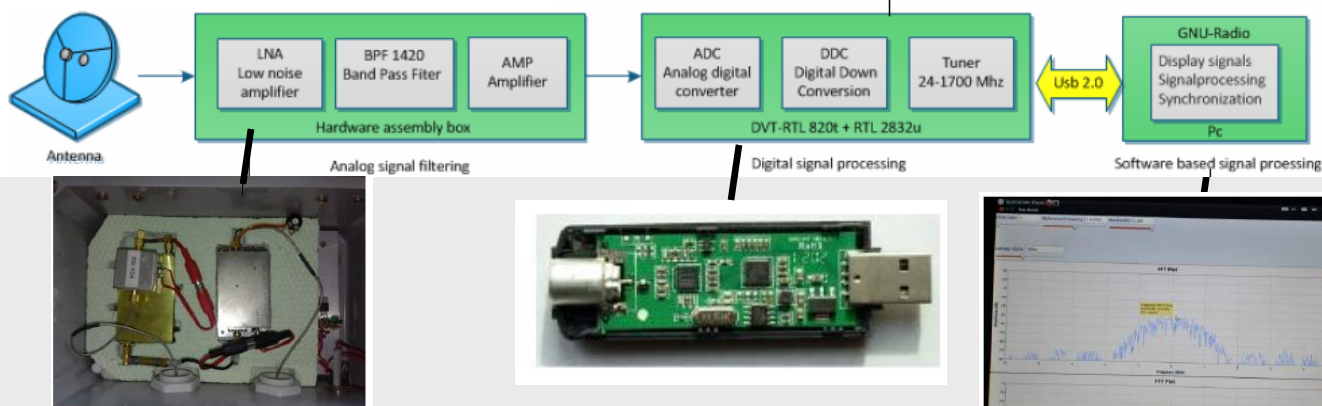
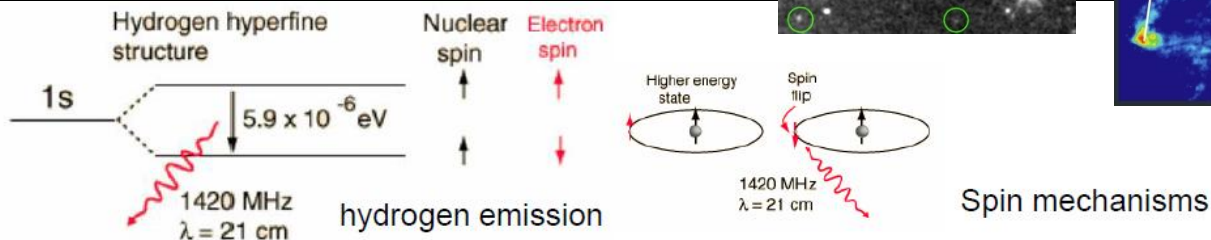
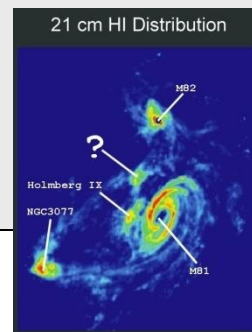
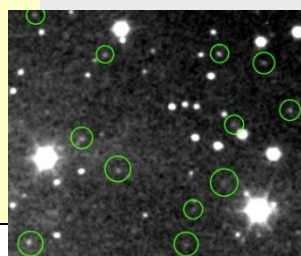
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### Student affairs

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## Ground based station for supernova remnant HI line radio wave detector and analyzer (SRWDA)



### Next Working Packages (2018 – 2021):

Installing Ground Station, Development of precise gimballed antenna to be able to take precise data from specific segments, Phase arrayed antenna development

## Space based infrared sensor for IAP-SAT

## IR Astronomy

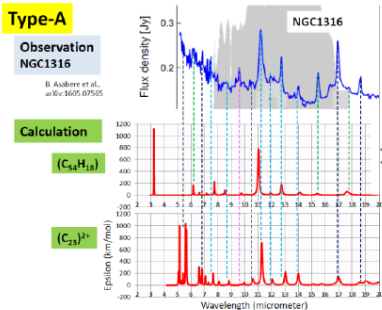


Illustration 3: Type-A spectrum. Calculated spectrum of  $(C_{54}H_{18})$  and  $(C_{23})^{2+}$  are compared with observed one of NGC1316. Blue dashed lines coincident with both molecules, whereas green with only  $(C_{54}H_{18})$ , black with  $(C_{23})^{2+}$ , pink no coincidence with both molecules.

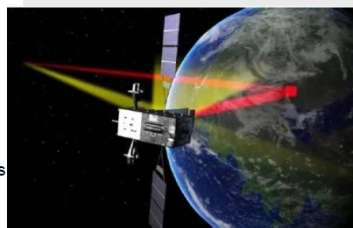


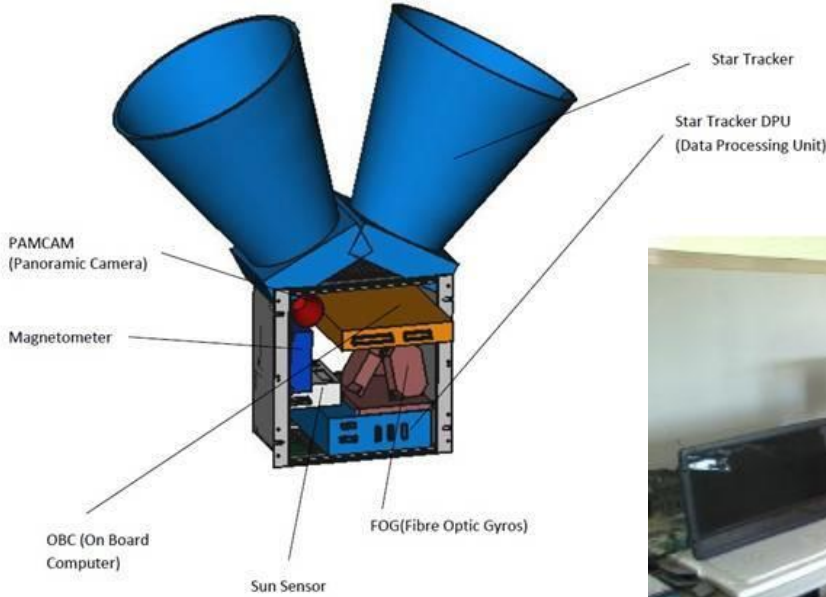
Illustration 1 : Caption: Black Widow nebula captured by Spitzer's IRAC. Credit: NASA/JPL-Caltech/E. Churchwell (University of Wisconsin-Madison) and the GLIMPSE Team

### Next Working Packages (2018 – 2021):

- Design of a proper infrared sensor
- Collect IR data from satellite platform in Canopus Region

# Space Based Platform IAP-SAT

## Satellite Bus

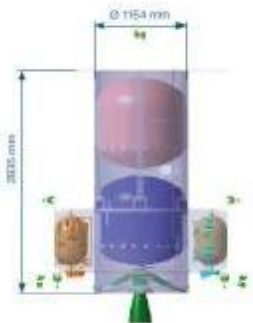


## CHEMICAL ORBITAL PROPULSION MODULE

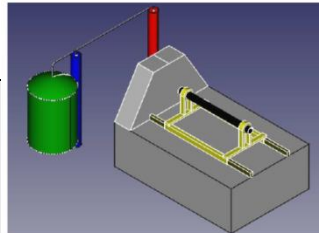
Chemical Orbital Propulsion Module for transfer orbit, attitude maneuver during transfer orbit, station keeping and deorbiting.

EPDM - BLADDER TANK BT 01/0

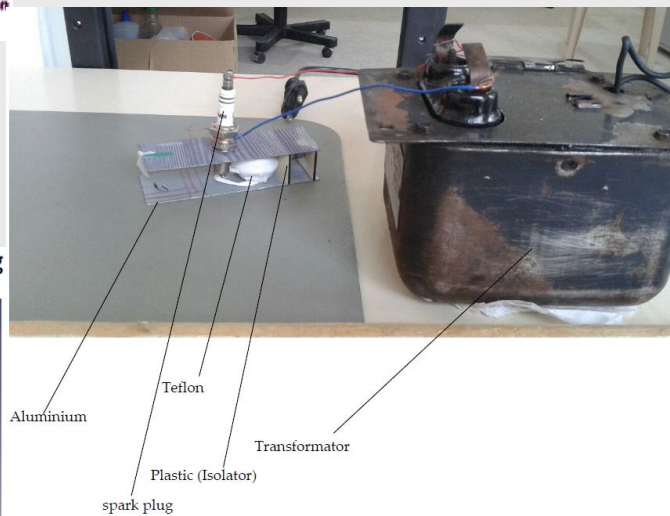
Bi-propellant UPS B2  
Propellant Loading Mass: 1600 kg



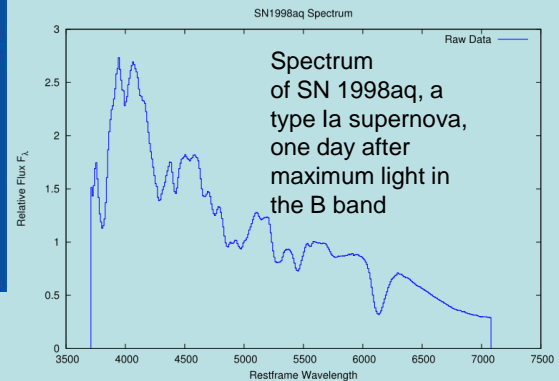
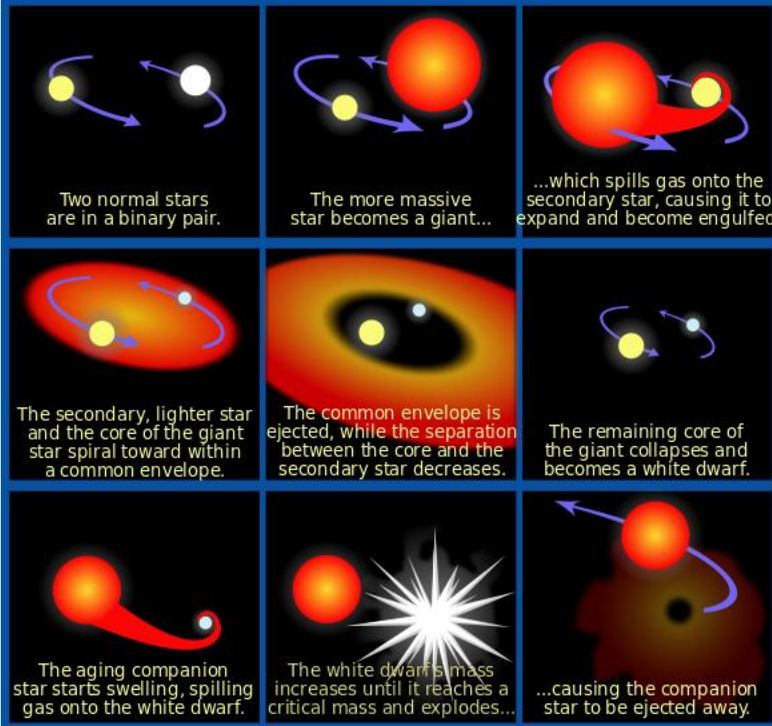
Chemical Propulsion Testrig



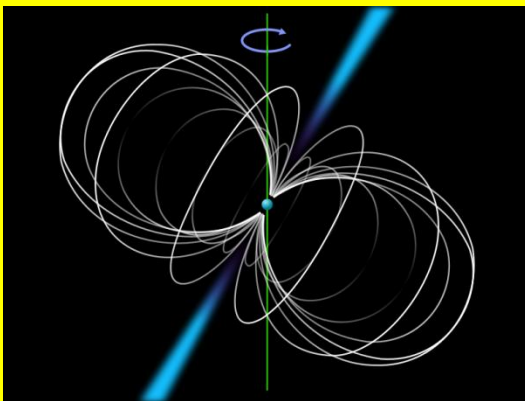
## Electrical Propulsion Unit



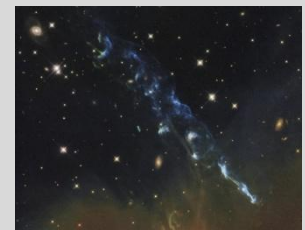
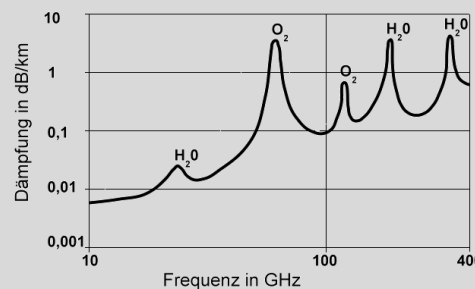
### The progenitor of a Type Ia supernova



### Models for Supernovae



Models for Pulsars



Models for Interstellar Media (ISM) Processes

### Areas:

Plasma Physics, Thermodynamics, Magnetohydrodynamics (MHD), thermo-nuclear star processes, fusion processes, object orientated programming (C++/qt)