



High Performance Computing in Observational Astronomy : Requirements and Challenges

Pune, India 12-16 October 2009

A view of the GMRT array

Courtesy : B. Premkumar, NCRA

Aim of the Workshop :

The theme of this meeting will be to discuss computationally intensive techniques and new software approaches that are important for different branches of observational astronomy. Requirements for future large instruments including the Square Kilometre Array radio telescope, Giant Segmented Mirror optical telescopes, the ASTROSAT mission and several others will be addressed in depth. Participation by both academia and industry is planned.

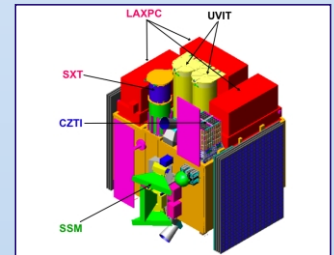
Topics to be covered :

- 1) Computationally intensive techniques for real-time observations, such as :
 - (a) Real-time software back-ends in radio astronomy : Correlators & beamformers
 - (b) Real-time calibration and imaging in radio astronomy
 - (c) Interference excision techniques in radio astronomy
 - (d) Active and adaptive optics for multi-segment optical telescopes
 - (e) Wide field X-ray imaging, coded mask image analysis
 - (f) Computing for large air shower and Cerenkov arrays
- 2) High performance computing requirements for off-line data analysis, such as :
 - (a) Interferometric calibration and wide field imaging techniques
 - (b) Searching for pulsars and transient sources using interferometric arrays
 - (c) Data pipelining for large surveys, such as SDSS, PANSTARRS, LSST etc
 - (d) Data archiving, mining and visualisation; virtual observatories
 - (e) Matched filtering and other data analysis for gravitational wave astronomy
 - (f) Deconvolution and foreground subtraction for CMB maps
- 3) Growth and challenges in computing technology for astronomy :
 - (a) Expected growth path for computing hardware and data storage technologies
 - (b) HPC, GPGPU and Grid computing; agent based computing; cloud computing
 - (c) Computing requirements for large projects like the SKA, Optical Segmented Mirror Telescopes.
- 4) Telescope control and monitor software, systems software design for large observatories



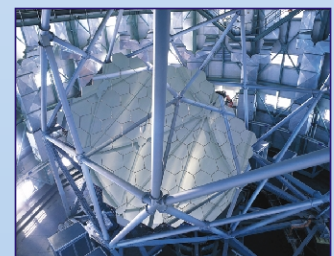
A possible configuration for the SKA

Courtesy : SPDO



Schematic view of the ASTROSAT satellite

Courtesy : ISRO



Segmented primary mirror of the SALT

Courtesy : SALT Foundation

Scientific Organising Committee

- | | |
|---|---|
| <ul style="list-style-type: none"> • Arun Agarwal, University of Hyderabad • Dipankar Bhattacharya, IUCAA (Chair) • Tim Cornwell, ATNF • Peter Dewdney, SKA Program Development Office • Yashwant Gupta, NCRA (Co-Chair) • Athol Kembhall, UIUC • Goldi Misra, C-DAC • V. Sundararajan, C-DAC | <ul style="list-style-type: none"> • Matthew Bailes, Swinburne • Jayaram Chengalur, NCRA • Marco de Vos, ASTRON • K.S. Dwarakanath, RRI • Duncan Hall, SKA Program Development Office • Ajit Kembhavi, IUCAA • P. Sreekumar, ISRO • Robert Lupton, Princeton University |
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The PARAM YUVA Cluster

Courtesy : C-DAC

Important Deadlines : Early Registration - 15 June 2009, Abstract Submission - 15 July 2009

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NCRA : National Centre for Radio Astrophysics, Pune, India
 IUCAA : Inter-University Centre for Astronomy and Astrophysics, Pune, India
 C-DAC : Centre for Development of Advanced computing, Pune, India

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