

Astronomy Outreach and Education in India:

The steps to the future

Dr Priya Shah (Hasan)
Asst Professor in Physics
Maulana Azad National Urdu University
Hyderabad
priya.hasan@gmail.com



Astronomy as a means to instill scientific temper....

Scientific temper involves the application of logic and the avoidance of bias and preconceived notions

A three step process:

Outreach:

General Public

Schools

University

Education:

Childhood

School

University

“In science –in fact, in most things –it is usually best to begin at the beginning. In some things, of course its better to begin at the other end. For instance, if you want to paint a dog green, it might be best to begin with the tail, as it doesn’t bite at that end. And so”

- Lewis Carrol



Childhood

- Lack of inspiring teachers, low self esteem
- Large number
- Syllabus

Parents

Peer pressure

Exams, Grades

Lack of
practicals/demos

Distrust between the two, Mismatch of Expectations

“I have never let my schooling interfere with my education.”

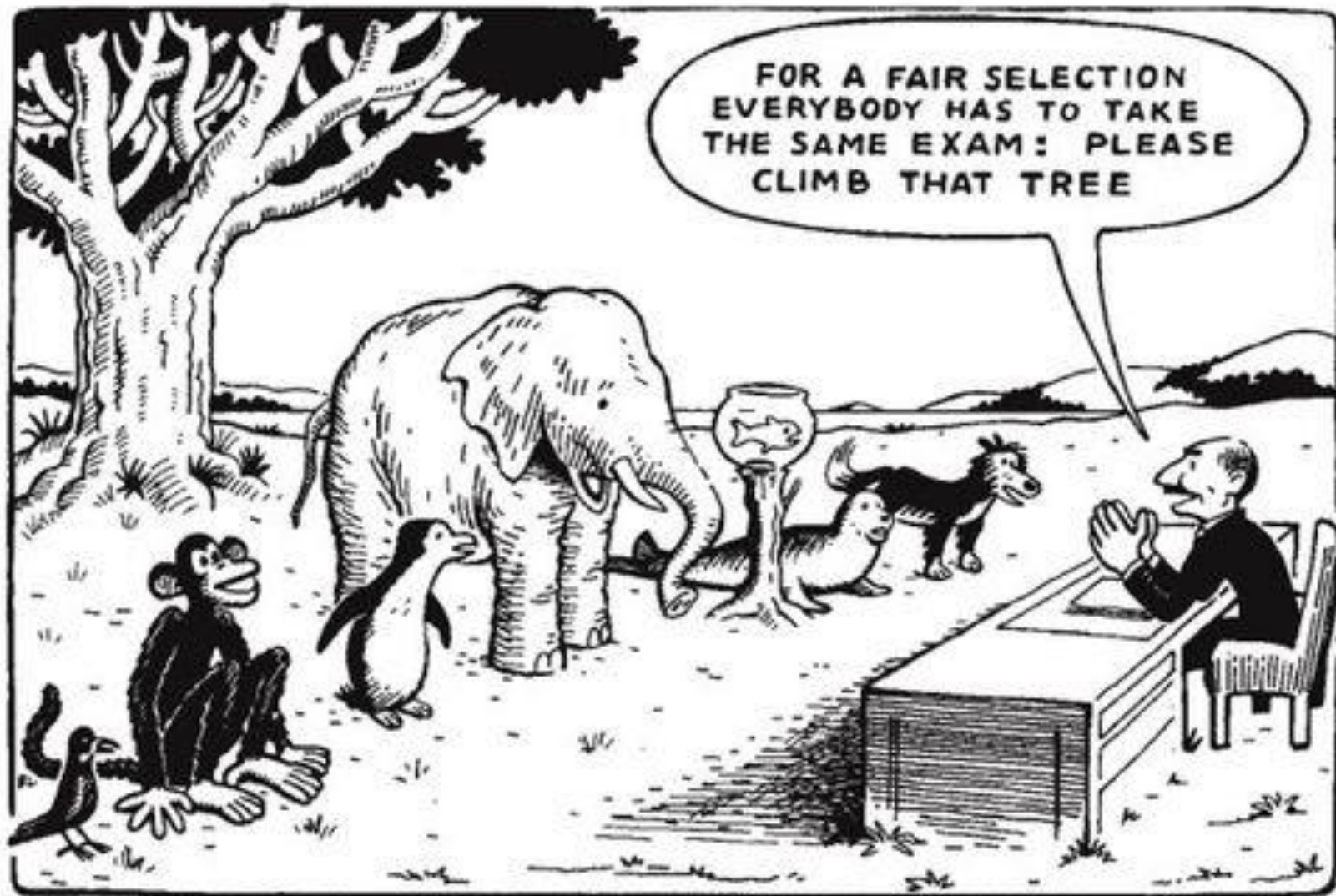
Vienna 21/11/17

Priya Shah Hasan

5

— Mark Twain

Einstein on formal education "Education is what remains after one has forgotten what one has learned in school" and "It is a miracle that curiosity survives formal education" and finally "The only thing that interferes with my learning is my education".



Olympiads, KVPY

Astronomy Olympiads being different from Physics Olympiads & KVPY:

- Not part of regular competitive exams
- Care taken to frame new questions
- A good number are interested in serious/professional astronomy

Astronomy Education

- Courses at UG, PG
- PG Astro...eligibility to teach
- PhD Astronomy, Issues in Biological Sciences
- Jobs
- NET

After PhD

- Lack of jobs, Career options
- Leaking pipe



"You're overqualified, Sir. In other words, you've become too smart for your own good."

Outreach

- School Children
- Olympiads
- Project Students
- Career Counselling

Schools



Vernacular languages
Activities
Trips
Range of Eco/Socio classes



Telugu? Urdu? Vernacular?



మాట్లాడుతున్న హాసన్

జమ్మికుంట :

విశ్వంలో గ్రహాలు ఎనిమిదే అని ప్రముఖ ఖగోళ శాస్త్రవేత్త ప్రొఫెసర్ ఎస్ ఎన్ హాసన్ అన్నారు. సోమవారం ఆయన జమ్మికుంట ప్రభుత్వ డిగ్రీ కళాశాలలో ఎవెక్స్-దాని ఆవిర్భావంకే అనే అంశంపై నిర్వహించిన వర్క్ షాప్ లో మాట్లాడారు. గ్రహాలు, వాటి జీవిత కాలం, నక్షత్రాల వయసు, చిగ్గి బ్యాంగ్ సిద్ధాంతం, కృష్ణదీపాలు, తేలిందన్నారు. చంద్ర గ్రహంపై

- శాస్త్రవేత్తల వెల్లిడి
- జమ్మికుంట డిగ్రీ కళాశాలలో వర్క్ షాప్



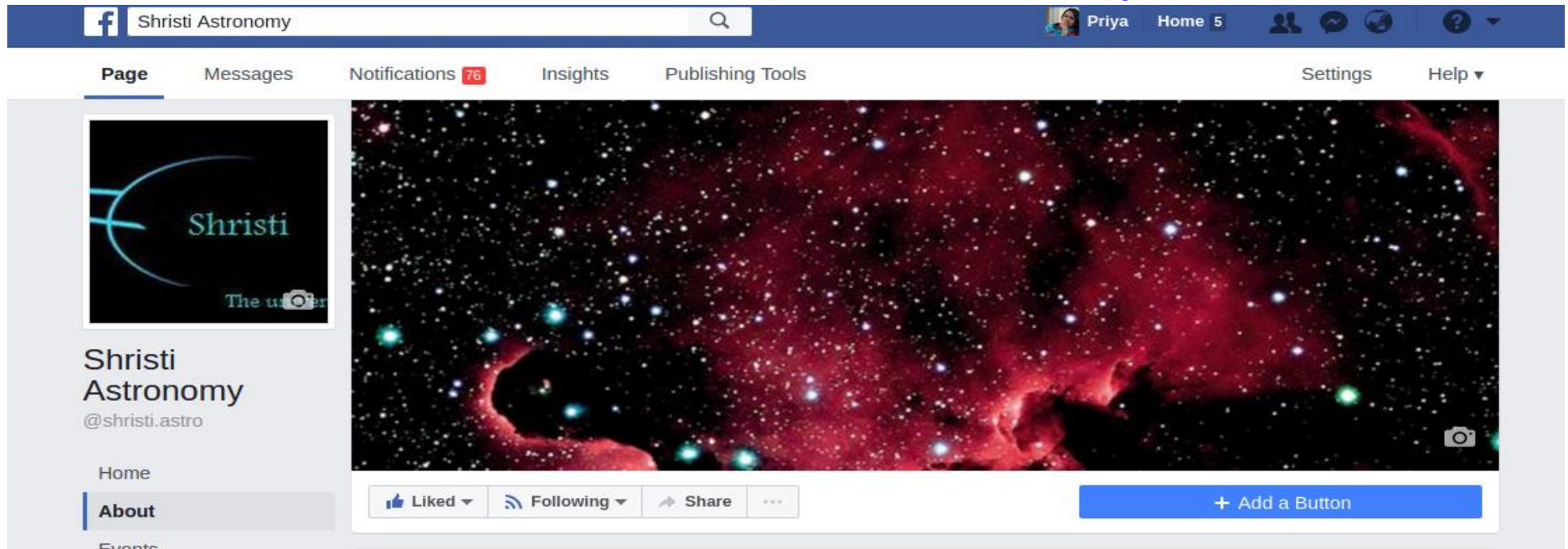
ఎదస్సులో పాల్గొన్న విద్యార్థులు

ఎలాంటి వాతావరణం లేకపోవడం, వారిని అభినందించారు. సరికొత్త దాని గురుత్వాకర్షణ కారణమన్నారు. ఆలోచనలతో మాత్రం ఆవిష్కరణలు విశ్వం స్తూర్యం ఉంటుంది. విశాఖ ఆస్కార్ కాలిక్యులం ముంద్రురైన సృజన



T

Shristi Astronomy



Shristi. The universe beckons.

Shristi is a medium for curious minds to explore the wonders of astronomy with expert and professional guidance.

Sustained contact/outreach: websites/fb
Vienna 21/11/17 Priya Shah Hasan 14

Olympiads

- Problem Solving
- Nurture Camp:
Taste of research



Winter Schools with UWO (UG+PG)



IAU OAD
12 countries!!
One sky!!!



Vienna 21/11/17

P

SWAN (Sky Watch Array Network)

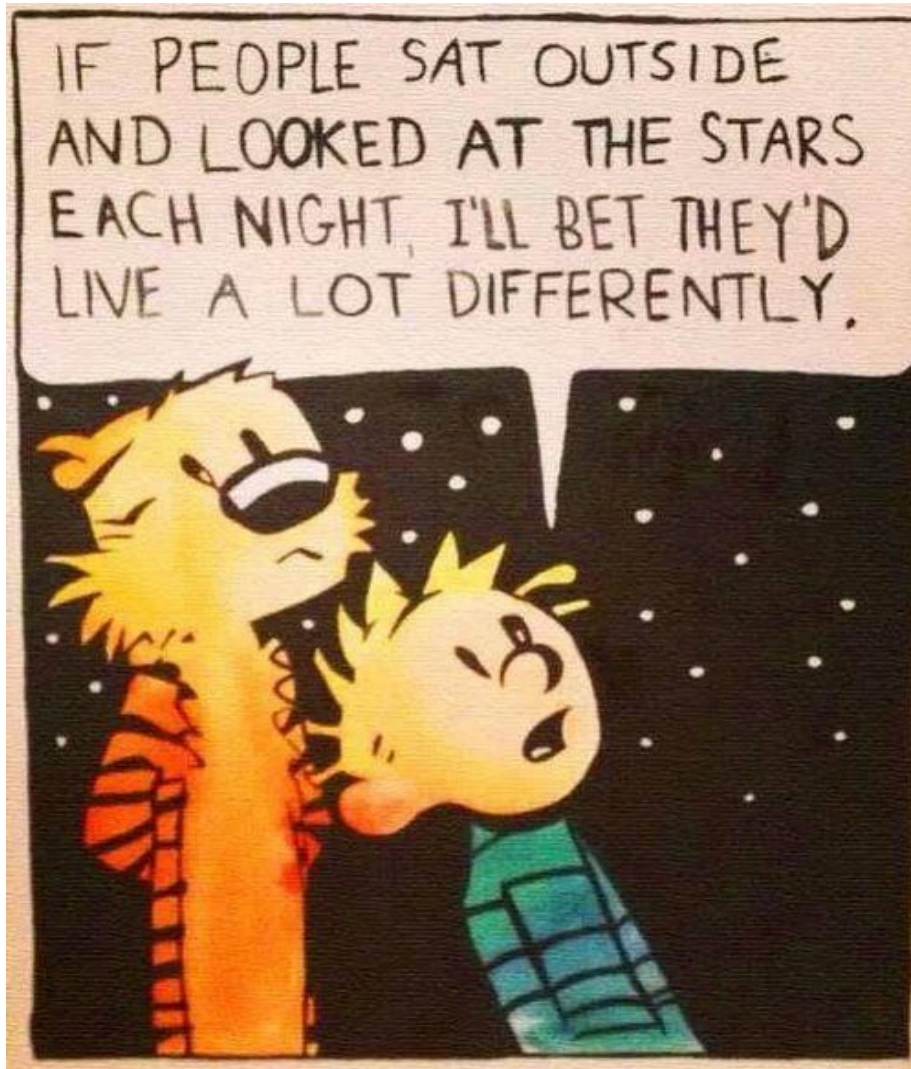


Need for interactive projects



Murchison Widefield Array (MWA)
radio telescope.

ASI-POEC



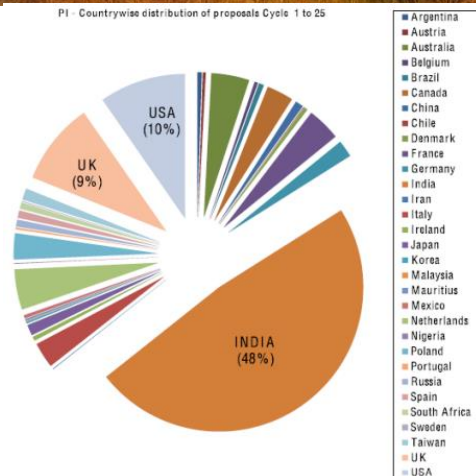
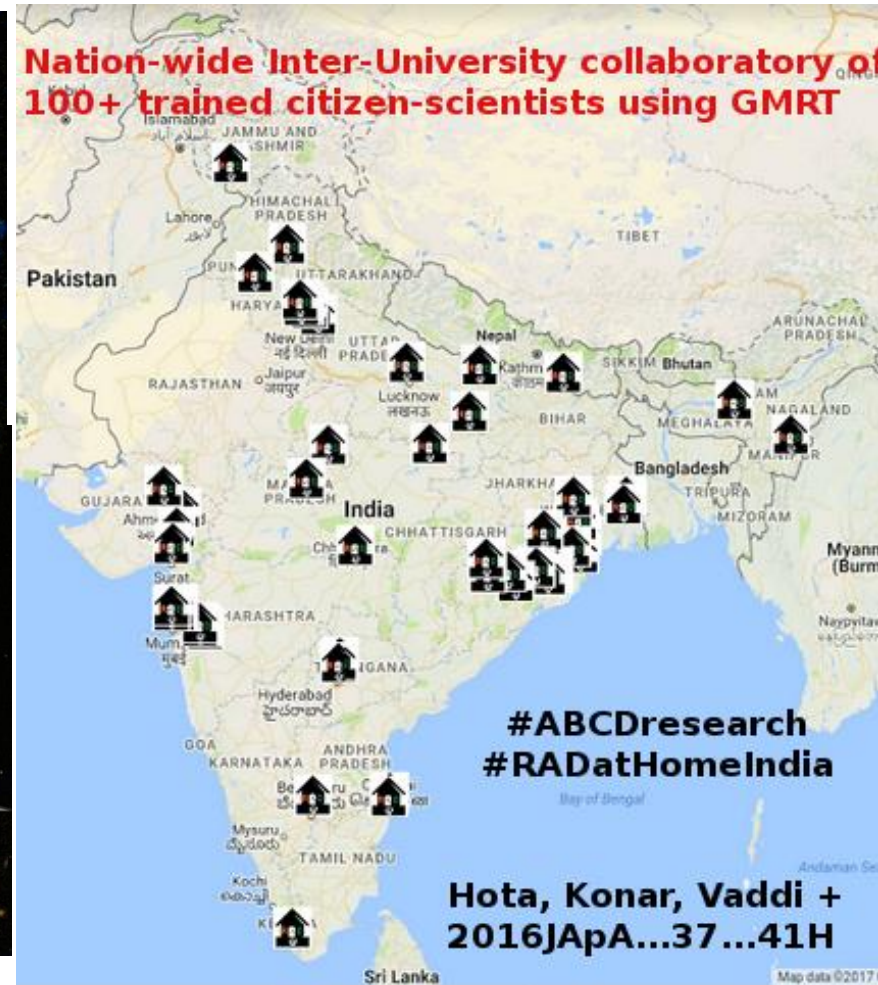
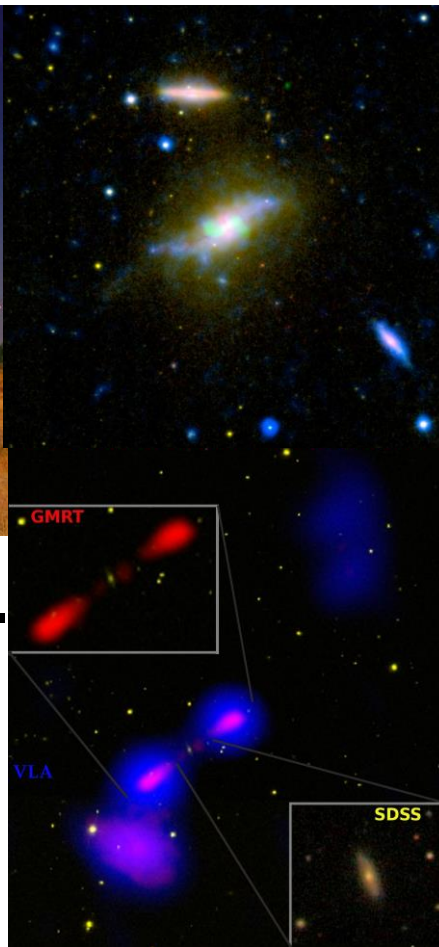
Vienna 21/11/17

Priya Shah Hasan

- Exposure Camps
- Jantar Mantar
- Festival of Measurement
- Astrophotography
- Exhibition
- Competition
- Astronomy Films
- Zero Shadow Day

RAD@home Astronomy Collaboratory, India

The only Indian Citizen-science research programme in Astronomy
Any BSc/BE Can Do research using GMRT sitting @home anywhere in India
<http://adsabs.harvard.edu/abs/2016JApA...37...41H>



Hota +.
2011
2012
2016

International use of GMRT

For more discoveries of Spica-like spiral-host radio galaxies & NGC3801-like cases of AGN-feedback in galaxy evolution

GMRT + Peoples-power in SKA-era

RAD@home Citizen-science with GMRT

First Indian citizen-science research program.
Founded in April 2013 by Dr. Ananda Hota.

It is zero-funded, zero-infrastructure initiative and is run through Facebook/Google.

RAD@home creates a platform of equal-opportunity of growth for science-educated Indian citizens through Internet, independent of their socio-economic and geo-political status.

Anyone (student/employed/unemployed) with a bachelor degree (in any STEM field) can join the group and do research sitting at home.

RAD@home Citizen-science with GMRT

GMRT time was approved at 4 cycles for several of the newly discovered objects. This reflects scientific importance of the newly discovered objects and quality of the research proposal.

Article published in the Indian Academy of Sciences in the special issue of the Journal of Astrophysics and Astronomy titled

"*Science with the Square Kilometre Array: An Indian Perspective*". (http://astron-soc.in/bulletin/asics_vol013/pdfs/141_A_Hota.pdf)

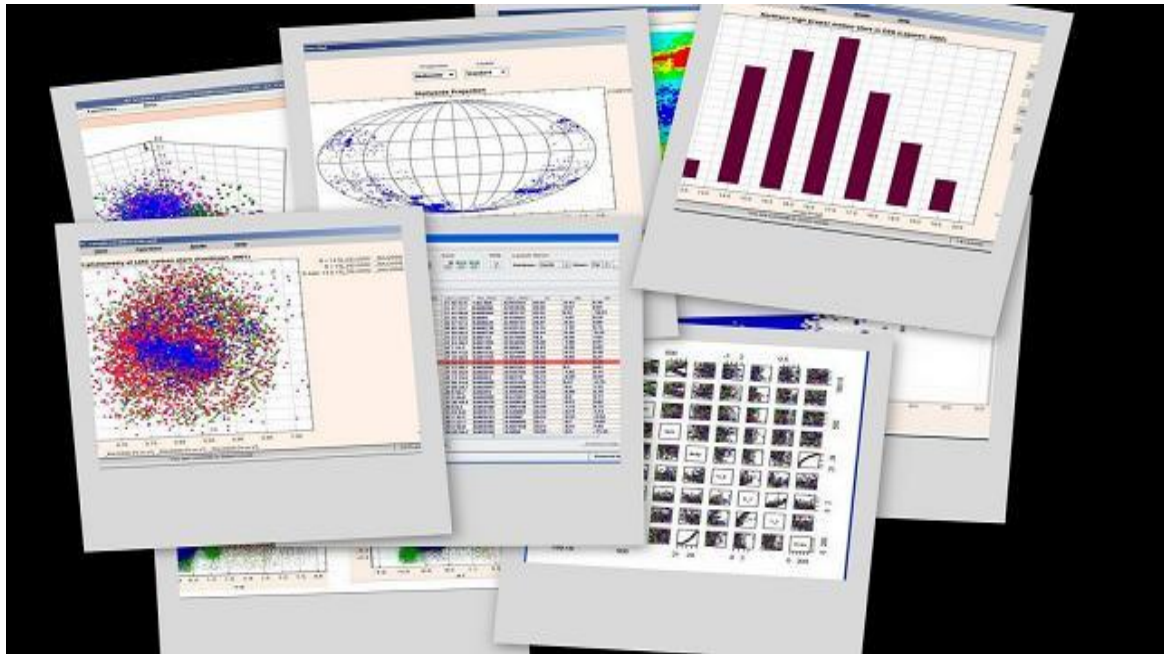
Astro-Themed Expts

The Public Outreach and Education Committee (POEC) of the ASI, IUCAA:

18-20 June 2018, "Workshop for developing astronomy-themed experiments for colleges and universities".

The idea is to bring together teachers and researchers from Universities and Institutes to collate, discuss, analyse and document possible astronomy-themed experiments that could potentially be introduced in the physics syllabi at BSc and MSc levels in India.

Virtual Observatory India



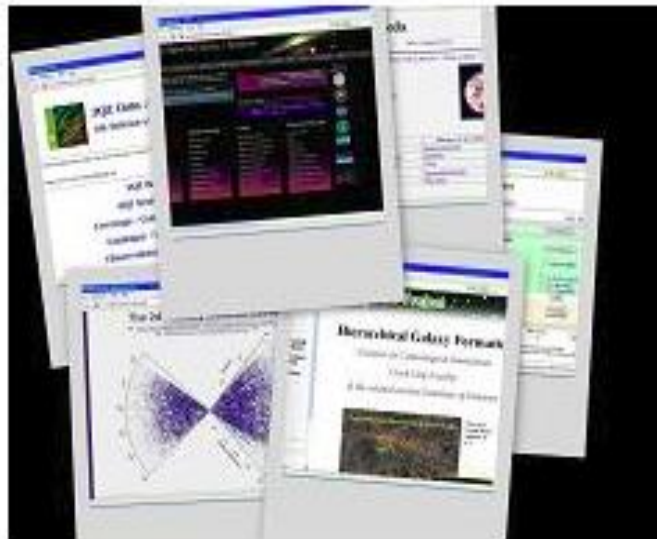
Good Data Practices:

Data + Software interface

VO Standards, Visualization

Code to be used at data itself...python

VO-DataArchives



[2dfGRS - 2 Degree Field Galaxy Redshift Survey](#)

[2MASS-Two Micron All Sky Survey](#)

[2QZ - 2 Degree Field QSO Survey](#)

[Chandra - Data Available via FTP](#)

[HYPERLEDA - The Hyperleda Mirror](#)

[NIRLIB - A Near-Infrared Stellar Spectral Library](#)

[Scisoft - An Astronomical Software Collection](#)

[SDSS - Sloan Digital Sky Survey, Data Release](#)

[VizieR - The VizieR Service](#)



[Home](#) [Observatory](#) [Data](#) [Recent Publications](#) [Publications \(Till 2011\)](#) [IIA Facilities](#) [People](#) [Contact](#)

Welcome to the homepage of Kodaikanal Solar Observatory (KSO)



The Kodaikanal Observatory of the Indian Institute of Astrophysics is located in the beautiful Palani range of hills in Southern India. It was established in 1899. Solar observations at this observatory over the last 100+ years provide one of the longest continuous series of solar data. Apart from that, simultaneous observations in different wavelengths make this data a unique one and suitable for multi-wavelength studies.

This century long observation has been carried out in three different wavelength bands:

White-light (since 1904)

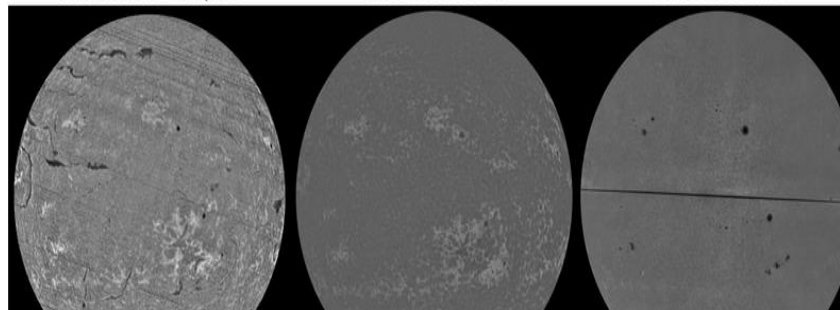
Ca-K (since 1907)

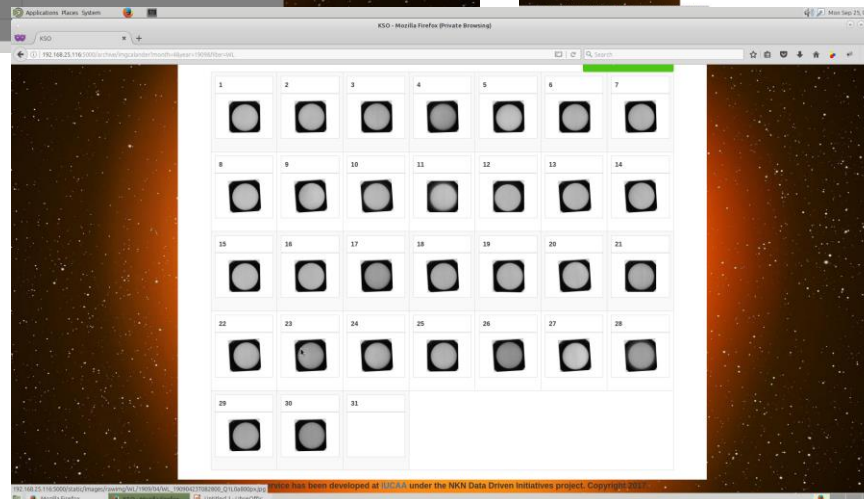
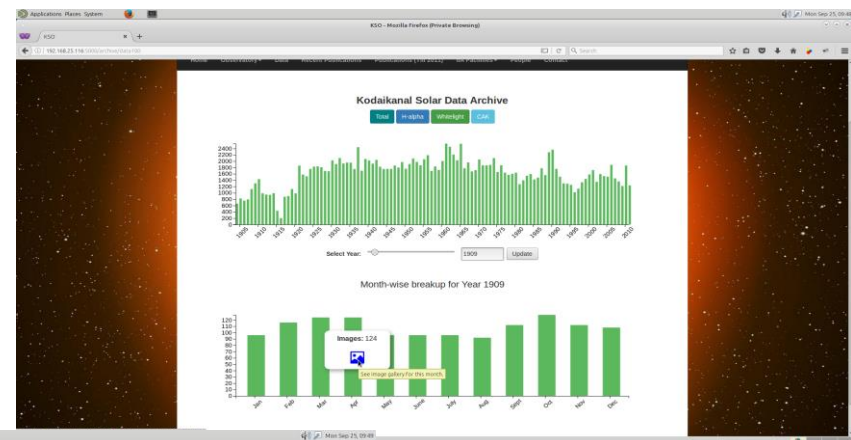
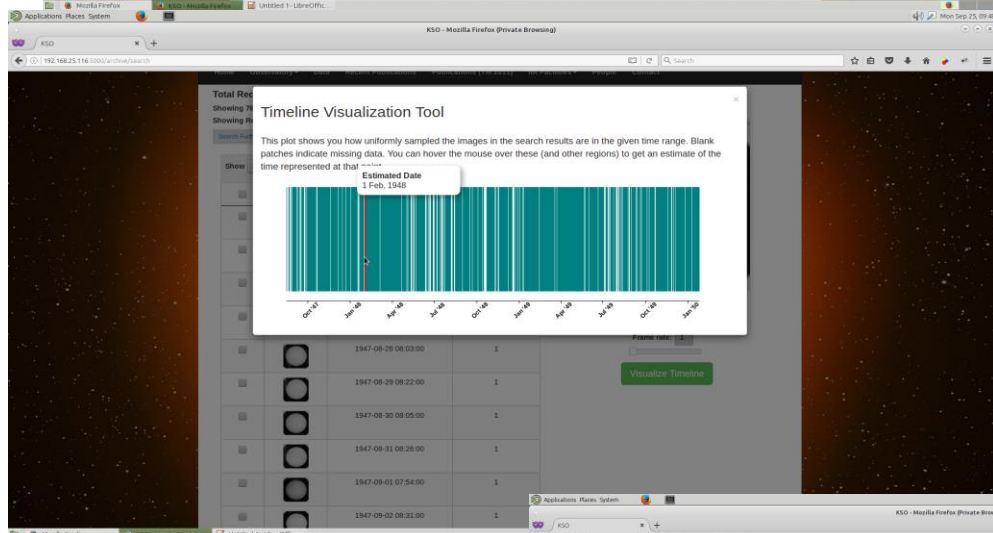
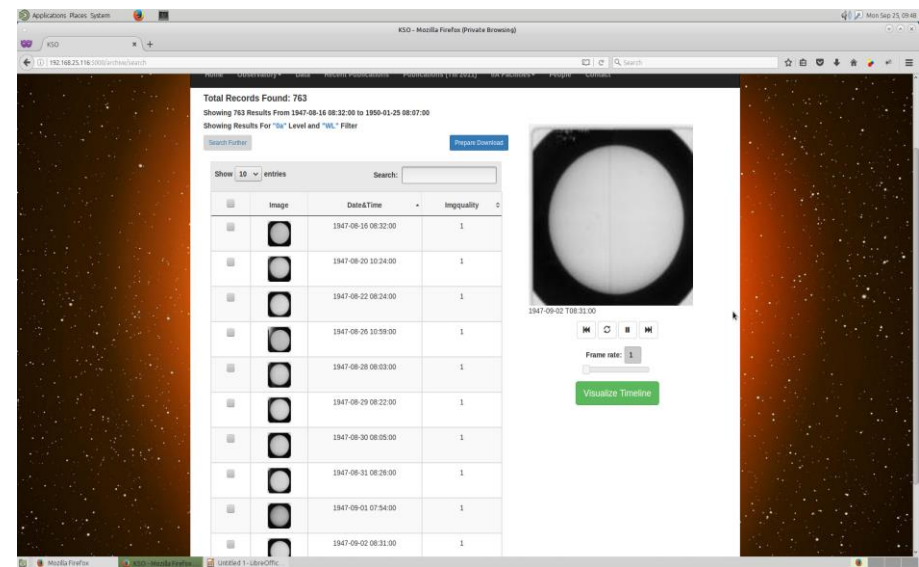
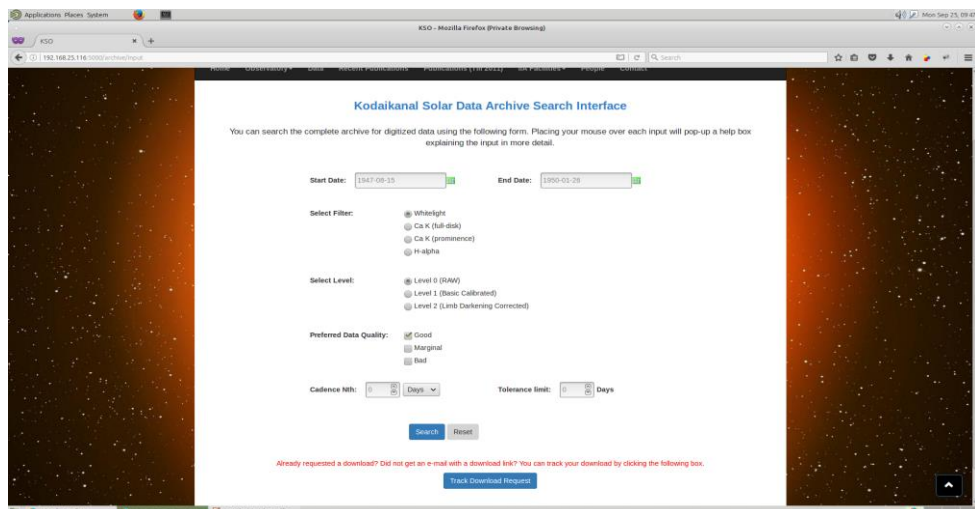
H α (since 1912)

01.01.1958 H-alpha

01.01.1958 CaK

01.01.1958 WL





Vienna 21/11/17

26

THE CATALINA REALTIME TRANSIENT SURVEY

Data Release 3 (Beta)

[Home](#) [FAQ](#) [Co-adds](#) [Contact](#) [About](#)

Image Access

Search For:

MS1

RA: 202.484, DEC: 47.231

Object Name or RA, DEC
in following formats:

210.76 -12.251 (both degrees)

14:45:36.0 -12:15:3.6

14 45 36.0 -12 15 3.6

14h45m36.0s -12d15m3.6s

Within Radius: (arcmin)

0.1

max. 5 arcmin

Catalog:

☒ CutOuts

☐ CoAdds

Search

Photometry Access

Search For:

Awaiting Input...

Object Name or RA, DEC
in following formats:

210.76 -12.251 (both degrees)

14:45:36.0 -12:15:3.6

14 45 36.0 -12 15 3.6

14h45m36.0s -12d15m3.6s

Within Radius: (arcmin)

0.1

max. 5 arcmin

Catalog:

☒ PhotCat

☐ OrphanCat

Search

Copyright © 2017. This service is hosted at IUCAA

Showing 180 results from CutOuts for RA = 202.484167°, DEC = 47.230556° within 0.1 arcminutes.

Each image cut-out is on average 16KB in size. Estimated download size for all images is ~2.81MB.

Note: OBS-DATE in YYYY-MM-DD format.

Download Selected Images

	CENTER_RA	CENTER_DEC	OBS-DATE	FILENAME
<input type="checkbox"/>	202.538178908	47.2513077589	2009-02-28	01_09FEB28_N46051_0004_cutout_1225.fits
<input type="checkbox"/>	202.545083511	47.2686974768	2011-06-09	01_11JUN09_N46051_0004_cutout_1224.fits
<input type="checkbox"/>	202.521758379	47.2663341825	2012-03-17	01_12MAR17_N46051_0002_cutout_1326.fits
<input type="checkbox"/>	202.524070495	47.2655131402	2012-04-27	01_12APR27_N46051_0003_cutout_1325.fits
<input type="checkbox"/>	202.529937117	47.2643254546	2009-02-28	01_09FEB28_N46051_0002_cutout_1225.fits
<input type="checkbox"/>	202.539854971	47.2628131068	2011-06-09	01_11JUN09_N46051_0001_cutout_1224.fits
<input type="checkbox"/>	202.542091883	47.2645968009	2012-04-01	01_12APR01_N46051_0002_cutout_1326.fits
<input type="checkbox"/>	202.518375276	47.269613795	2009-06-23	01_09JUN23_N46051_0002_cutout_1324.fits
<input type="checkbox"/>	202.545352358	47.2316944026	2009-07-31	01_09JUL31_N46051_0003_cutout_1223.fits
<input type="checkbox"/>	202.541150817	47.2222692212	2011-04-27	01_11APR27_N46051_0004_cutout_1325.fits
<input type="checkbox"/>	202.535339752	47.2022829662	2011-06-09	01_11JUN09_N46051_0002_cutout_1223.fits
<input type="checkbox"/>	202.539040105	47.1977089944	2005-12-10	01_05DEC10_UMES51_0004_cutout_1617.fits
<input type="checkbox"/>	202.539556766	47.2093321432	2012-02-12	01_12FEB12_N46051_0003_cutout_1326.fits
<input type="checkbox"/>	202.539554395	47.2093256166	2012-02-12	02_12FEB12_N46051_0003_cutout_1326.fits
<input type="checkbox"/>	202.545685286	47.2040019416	2012-04-27	01_12APR27_N46051_0002_cutout_1324.fits
<input type="checkbox"/>	202.545113745	47.2125219137	2009-01-31	01_09JAN31_N46051_0004_cutout_1325.fits
<input type="checkbox"/>	202.48879832	47.2643921913	2007-06-28	01_07JUN28_N46051_0004_cutout_1325.fits

Vienna 21/11/17

Open universe initiative

The world of archives are full of undiscovered scientific treasures

With this purpose in mind, its upto our imaginatin how to achieve our goals.

Relevant data information

Raw, catalogues, images, spectra, time-series, visualizations

Personalized, client-centric

The sky is the limit...upto your imagination!!