Accessibility of the ILMT survey data

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Abstract: The 4m International Liquid Mirror Telescope (ILMT) continuously scans the 22' wide strip of the zenithal sky and records the images in three broadband filters (g′, r′ and i′) using a 4Kx4K CCD camera. In about 10-12 hours of observations during a single night, ~15 GB of data volume is generated. The raw images resulting from the observations in Oct-Nov 2022 have been pre-processed and astrometrically calibrated. In order to exploit the scientific capabilities of the ILMT survey data by the larger scientific community, we are disseminating the raw data (along with dark and flat fields) and the astrometrically corrected data. These data sets can be downloaded by the users to conduct the scientific projects of their interest. In future, the data will be processed in near real-time and will be available via the ARIES data archive portal.

Introduction to the ILMT data

- The ILMT performs zenith sky observations of a 22′ wide strip of the sky using a 4K x 4K CCD camera in Time Domain Integration (TDI) mode.
- Each night either of the three sloan g, r or i filters are used for the observations.
- The exposure time in each image is set for 17 minutes.
- The raw image has dimensions of 4096 × 40960 pixels.
- While pre-processing the images, the first 4096 pixels are removed.
- The images are dark corrected and flat fielded.
- The astrometric calibration is performed on the pre-processed images. The calibrated image has a size of 604 MB.
- In about 10-12 hours of observations during a single night, nearly 15 GB of data volume is generated.
- The raw images along with dark frames and the pre-processed astrometrically calibrated data will be available for download via the ARIES cloud service.
- In future, the near real time calibrated data will be made available to the community via the ARIES data portal.

Header information of the ILMT images

Raw image

20221028-0053.fits

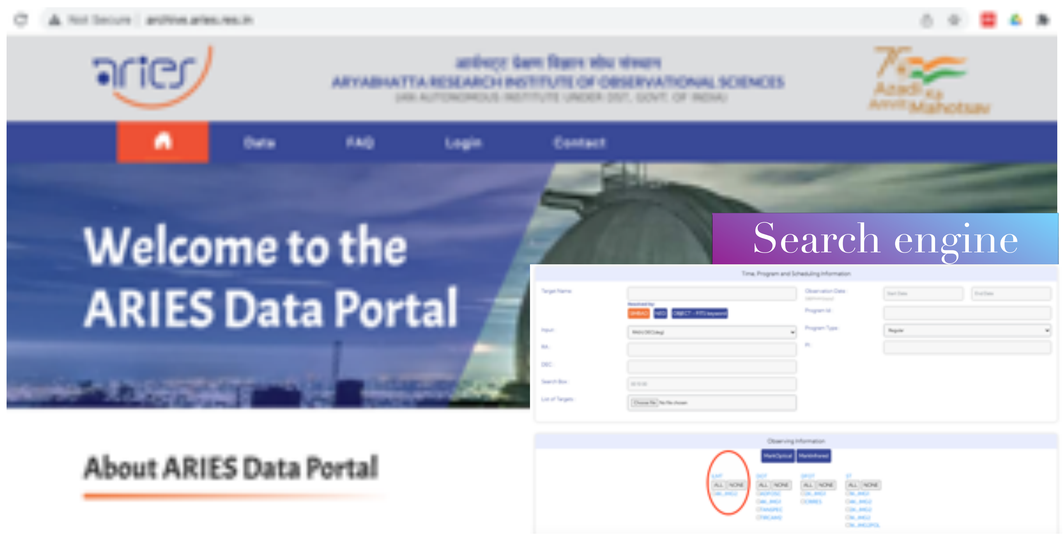
```
File  Edit  Font
PARAM96 =               1630.0 / CCD Temperature Setpoint,(-110.0 C)
PARAM97 =               1880.0 / Operational Temp,(-85.0 C)
PARAM98 =                    0 / Not Used
PARAM99 =                    2 / Port Select,(C)
PARAM100=                    0 / Window Heater,(Disabled)
PARAM101=              500.000 / Operational Pressure,(0.500 Torr)
PARAM102=             4000.000 / High Pressure Limit,(4.000 Torr)
PARAM103=                    0 / BPSensor Override,(Disabled)
PARAM104=                    1 / Cooler,(Enabled)
PARAM105=                    1 / Trigger Out Selector,(TTL)
PARAM106=                    1 / Trigger In Selector,(TTL)
PARAM107=                    0 / Acquisition Mode,(Normal)
PARAM108=                    1 / Trigger Input,(Pull Up)
PARAM109=                    1 / Trigger Input 2,(Pull Up)
PARAM110=                    0 / UART 100 byte Ack,(Off)
PARAM111=               1730.0 / CryoTiger Low-Flow Begin,(-100.0 C)
PARAM112=               1830.0 / CryoTiger Low-Flow End,(-90.0 C)
PARAM113=                    1 / Pixel Clear,ns
RA      = '04:55:22.04'         / J2000
DEC     = '29:20:11.9'          / J2000
CRPIX1  =               2159.6
CRPIX2  =               1894.8
CDELT1  =              9.1E-05
CDELT2  =              9.1E-05
CTYPE1  = 'RA---CAR'
CTYPE2  = 'DEC--CAR'
CRVAL1  =            72.476313
CRVAL2  =              29.3615
CUNIT1  = 'deg     '
CUNIT2  = 'deg     '
EQUINOX =            2022.82513
PC1_1   =                   0.0
PC1_2   =                   1.0
PC2_1   =                  -1.0
PC2_2   =                   0.0
OBJECT  = 'obs-i-2022102'
FILTER  = 'i       '
COMMENT  TDI Internal Paced, Exp Time= 00, Saved as: obs-i-20221028_0053.FIT /
END
```

After astrometric calibration

20221028_0053_wcs.fits

```
File  Edit  Font
DEC     = '29:20:11.9'          / J2000
OBJECT  = 'obs-i-2022102'
FILTER  = 'i       '
CF1     =    74.61684513193664
CF2     = 6.412162136678 49E-08
CF3     = 0.000104119533020022
CG1     =    29.35290902207658
CG2     = 1.28605478335499E-09
CG3     = -9.0803977806163E-05
CG5     = -3.8240330083964E-11
RELATION= 'RA = f1 + ((x-x0) * f2) + ((y-y0) * f3)  and DEC = g1 + ((y-y0) * &'
CONTINUE  'g2) + ((x-x0) * g3) + ((x-x0)*(x-x0)*g5)'
CTYPE1  = 'RA---CAR-SIP'
CTYPE2  = 'DEC--CAR-SIP'
CUNIT1  = 'deg     '
CRVAL1  =    74.61684513193664
CRPIX1  =                 2049
CUNIT2  = 'deg     '
CRVAL2  =    29.35290902207658
CRPIX2  =              18433.0
CD1_1   = 6.412162136678 49E-08
CD1_2   = 0.000104119533020022
CD2_1   = -9.0803977806163E-05
CD2_2   = 1.28605478335499E-09
EQUINOX =    2022.823758714085
RADESYS = 'FK5     '
PV1_0   =                    1
PV1_1   =    74.61684513193664
PV1_2   =    29.35290902207658
A_ORDER =                    2
A_2_0   = 4.21130556990071E-07
A_0_2   =                  0.0
B_ORDER =                    2
B_2_0   = -2.5935166378539E-10
B_0_2   =                  0.0
LONPOLE =                    0
LATPOLE =                   90
COMMENT  TDI Internal Paced, Exp Time= 00, Saved as: obs-i-20221028_0053.FIT /
END
```

ARIES Data Portal



Directory structure of ILMT data

LST ranges observed during 24/10/2022 to 01/11/2022 with the ILMT in different filters

Date	24/10/2022	25/10/2022	26/10/2022	27/10/2022	28/10/2022	29/10/2022	30/10/2022	31/10/2022	01/11/2022
Filter	r	r	g	g	i	i	i	g	r
LST									
00:03	✓	✓			✓	✓	✓	✓	✓
00:24	✓	✓	✓		✓	✓	✓	✓	✓
00:42	✓	✓	✓		✓	✓	✓	✓	✓
01:08	✓	✓	✓		✓	✓	✓	✓	✓
01:26	✓	✓	✓	✓	✓	✓	✓	✓	✓
01:45	✓		✓	✓	✓	✓	✓	✓	✓
02:03	✓	✓	✓	✓	✓	✓	✓	✓	✓
02:21	✓	✓	✓	✓	✓	✓	✓	✓	
02:39	✓	✓	✓	✓	✓	✓	✓	✓	✓
03:54	✓	✓	✓	✓	✓	✓	✓		✓
04:12	✓	✓	✓	✓	✓	✓	✓	✓	✓
04:32	✓	✓	✓	✓	✓	✓	✓	✓	✓
04:50	✓	✓	✓	✓	✓	✓	✓	✓	✓
05:08	✓	✓	✓	✓	✓	✓	✓	✓	✓
05:26	✓	✓	✓	✓	✓	✓	✓	✓	✓
05:44	✓	✓	✓	✓	✓	✓	✓	✓	✓
06:02	✓	✓	✓	✓	✓	✓	✓	✓	✓
06:20	✓	✓	✓	✓	✓	✓	✓	✓	✓
06:38	✓	✓	✓	✓	✓	✓	✓	✓	✓
06:56	✓	✓	✓	✓	✓	✓	✓	✓	✓

Data products available for download from 01-April-2023

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