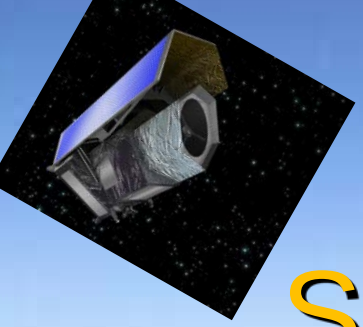


Space and Ground-Based Survey Operations at OmegaCEN + Target

Gijs A. Verdoes Kleijn

OmegaCEN, Kapteyn Astro Institute

Target, University of Groningen

esa

ESO

university of groningen

faculty of mathematics and natural sciences

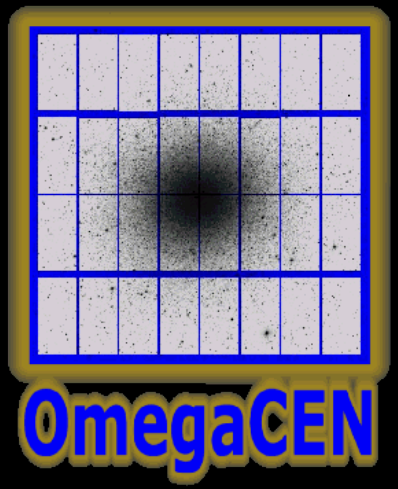
kapteyn astronomical institute

OmegaCEN

ASTRO WISE

NOVA

TarGet

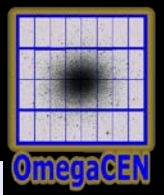


Pool

Astronomical IT experts + Astronomers

- Wide-field datacenter
- Survey operations
- Science support center
- DFS expertise center

“3 Datacenter “



Instruments

OMEGACAM@VST

raw science | reduced science | coadded science | sourcelists — proprietary

Find data for the OMEGACAM instrument.

VIRCAM@VISTA

raw science | reduced science | coadded science | sourcelists — proprietary

Find data for the VIRCAM instrument.

DECam@CTIO

raw science | reduced science | coadded science | sourcelists — world

Find data for the WFI instrument.

WFI@2.2m

raw science | reduced science | coadded science | sourcelists — world

Find data for the WFI instrument.

MEGACAM@CFHT

raw science | reduced science | coadded science | sourcelists — world

Find data for the MegaCAM instrument.

WFC@INT

raw science | reduced science | coadded science | sourcelists — world

Wide-Field Camera on the Isaac Newton Telescope at La Palma.

SUP@Subaru

raw science | reduced science — world

Suprime-Cam data from the Subaru telescope on Mauna Kea, Hawaii.

SDSS

SDSS-Photoz-DR7 | SDSS-SpecObjAll-DR7 | SDSS-PhotoObjAll-DR7 — world

Browse the SDSS DR7 catalog locally as SourceLists.

2MASS PSC

2MASS PSC SourceList — world

The 2MASS Point Source Catalog is available as a SourceList in our database.

UKIDSS

UKIDSS DR3 SourceList — world

The WFCAM Science Archive Large Area Survey sources are available as a SourceList in our database.

USNO-B1.0

USNO-B1.0 SourceList — world

US Naval Observatory B1.0 catalog, accessable as a SourceList.

HST ACS

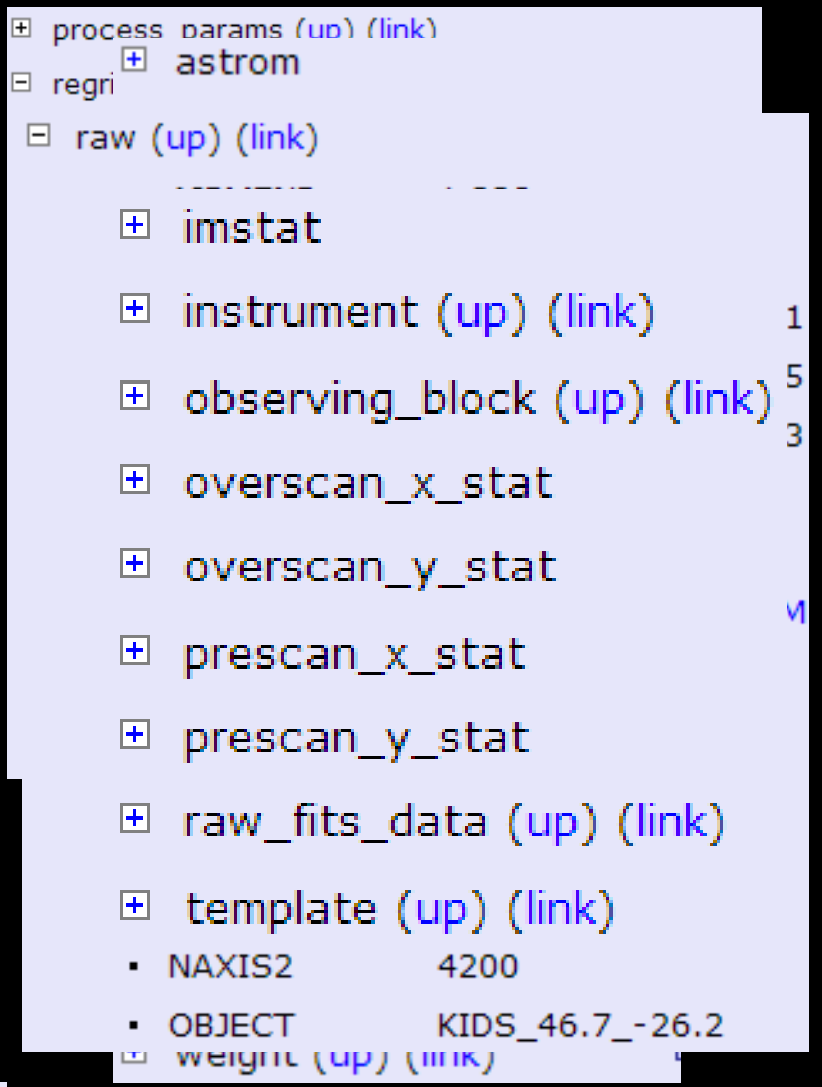
reduced science | sourcelists — world

Data from the Advanced Camera for Surveys instrument aboard the Hubble Space Telescope.
Only Drizzled images (in the form of ReducedScienceFrames) are currently supported. See this note on ACS data for more information.

LOFAR

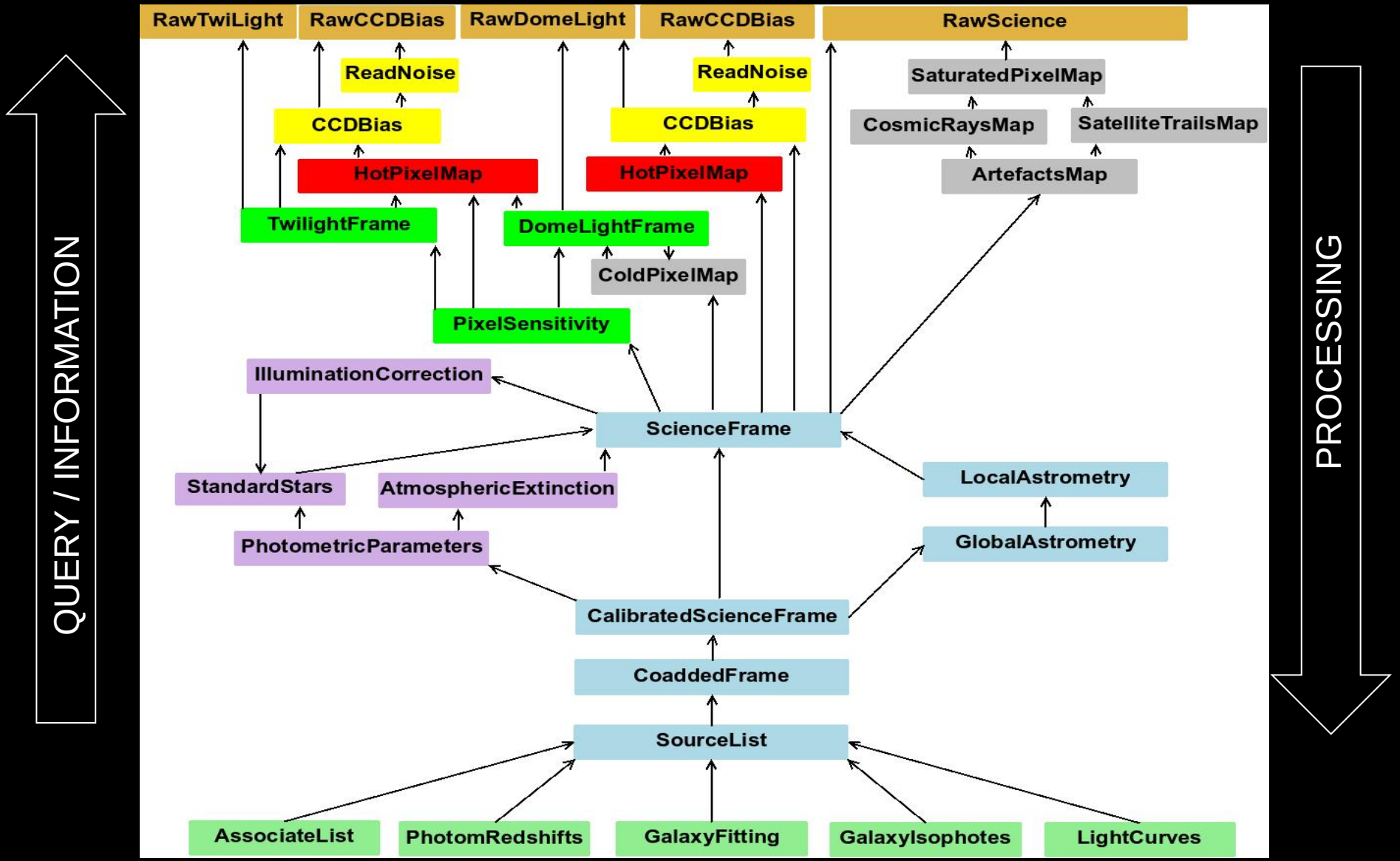
LOFAR data archive — world

Find data for LOFAR.



Data-centric + backward chaining

(see Valentijn, Buddelmeijer)

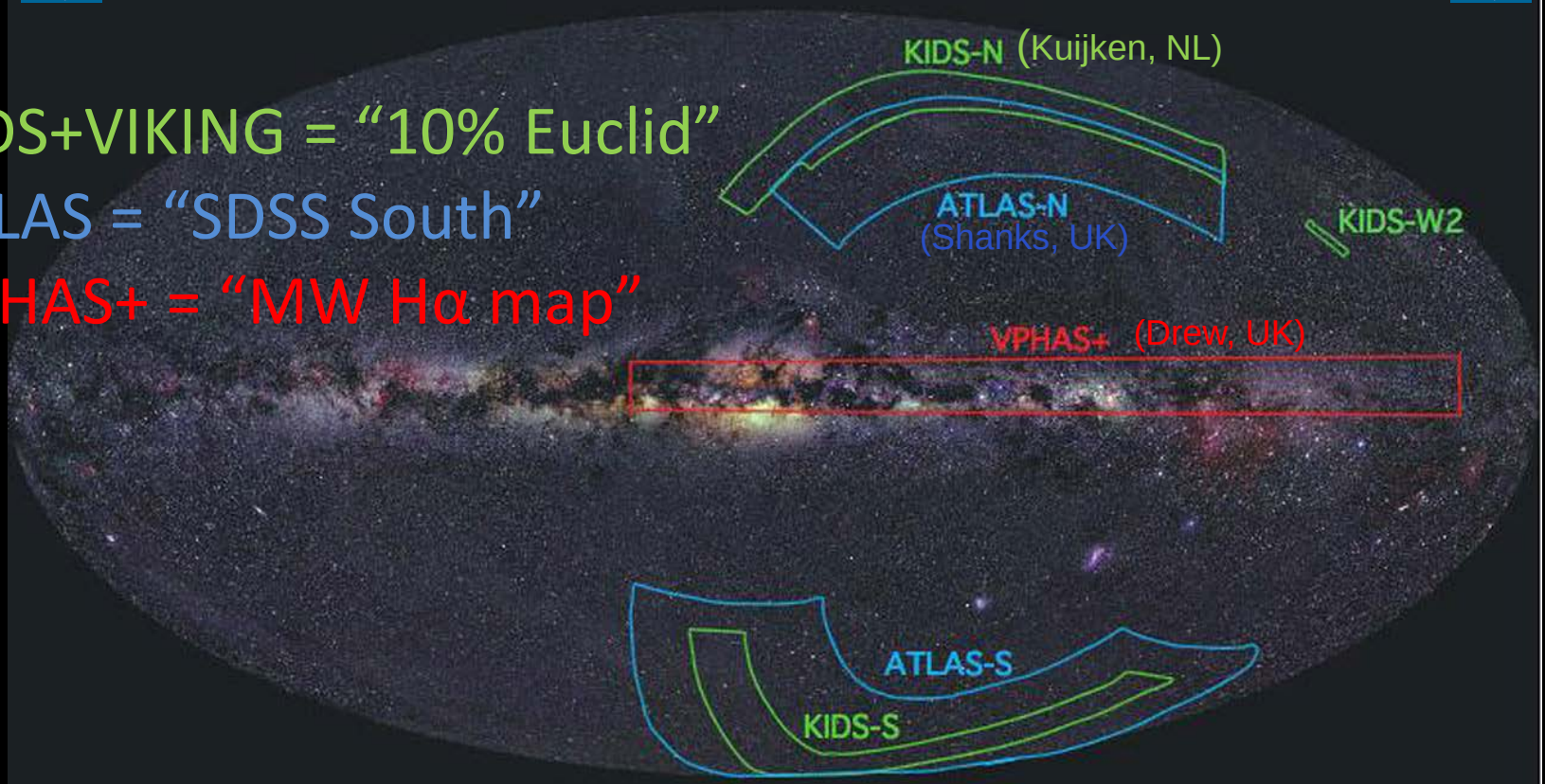


The OmegaCAM Public Surveys

KiDS+VIKING = “10% Euclid”

ATLAS = “SDSS South”

VPHAS+ = “MW Hα map”



Available in: ASTRO WISE

KIDS obs. progress: 22%

observing blocks | raw science | coadded science | sourcelists | proprietary

Find data for the KIDS project.

ATLAS obs. progress: 56%

observing blocks | raw science | coadded science | sourcelists | world

Find data for the ATLAS project.

VPHAS+ obs. progress: ~21%

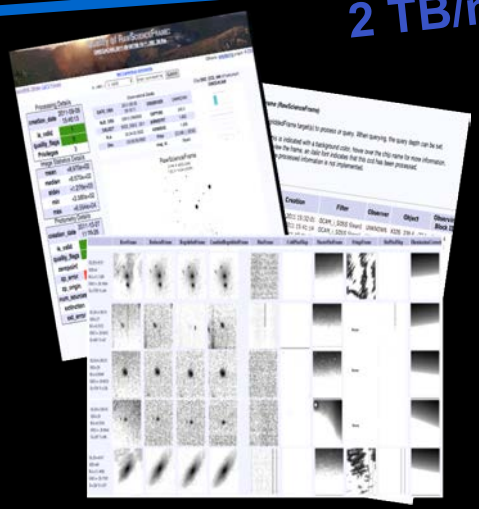
observing blocks | raw science | coadded science | sourcelists | world

Find data for the VPHAS+ project.

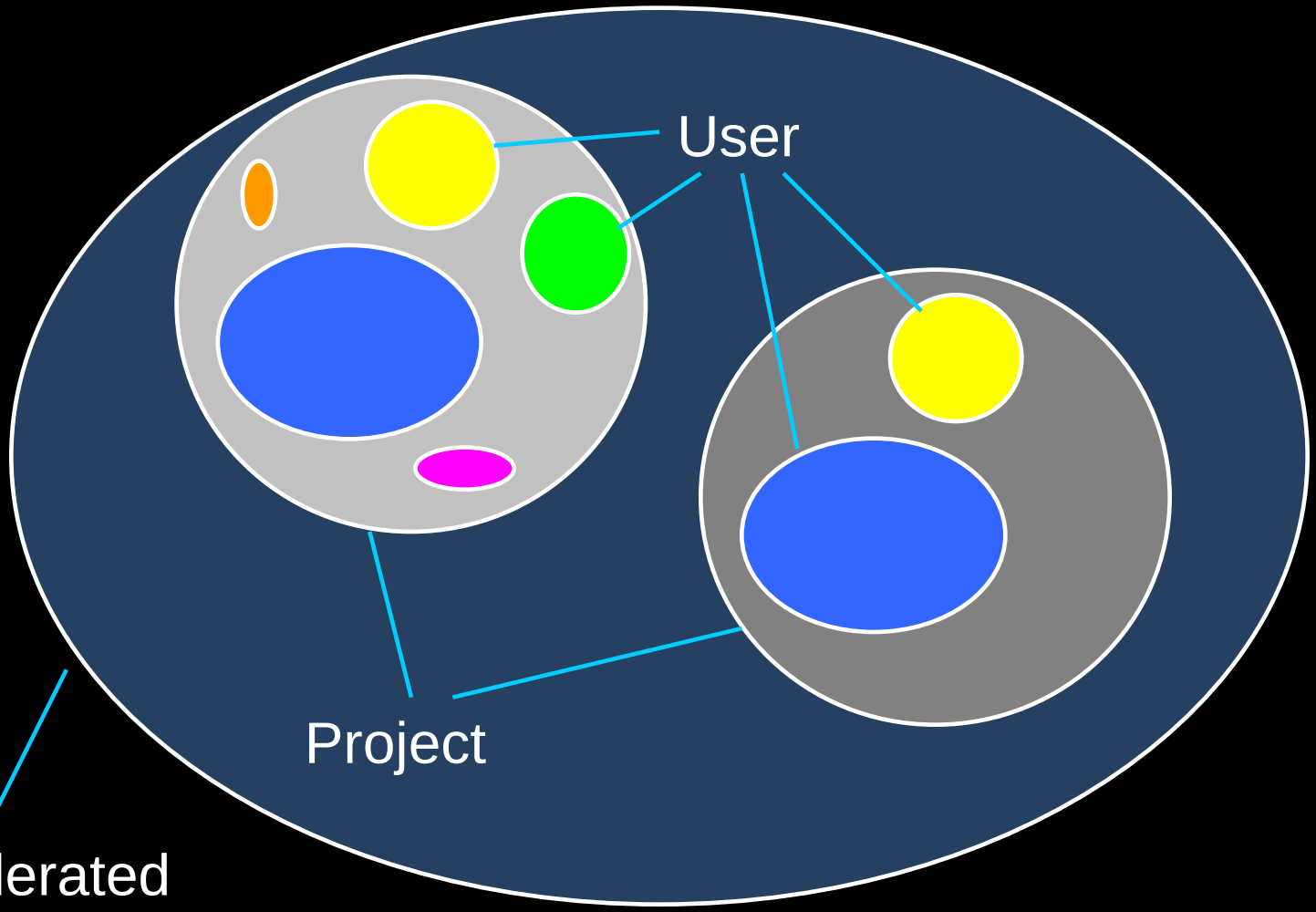
ASTRO WISE for federated survey handling

- **Information system**: monitor, calib, pipeline, archive, science analysis
- 11 European nodes
- 260 users (astro,prod,dev)
- Federated DBase, storage, compute
- 2Pb storage, 45M files
- Web + Python user interface

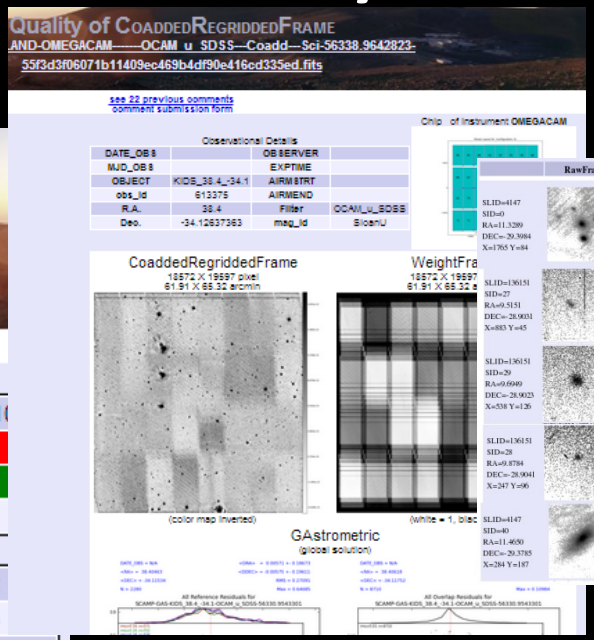
2 TB/month

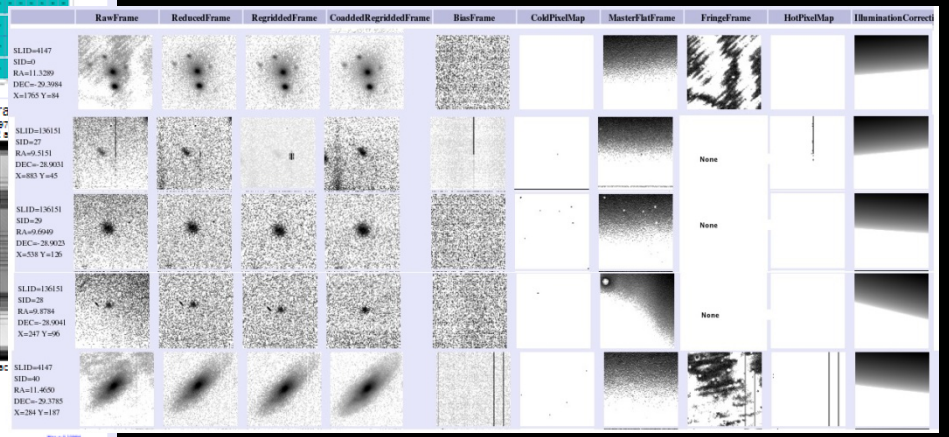


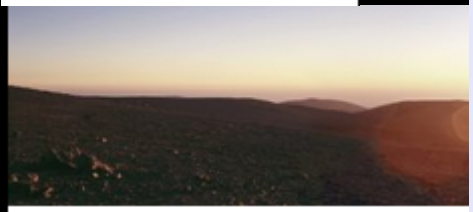
Survey data management



Quality Control







Astro-WISE Portal View object in: DBView, CalTS, or Process

Processing Details

creation_date	2013-02-15 23:1(
is_valid	0
quality_flags	0
Privileges	2

Image Statistics Details

mean	+1.784e-12
median	+1.588e-13
stdev	+4.106e-10
min	-1.133e-06
max	+7.778e-07

Astrometry Details
(derived from a **global solution**)

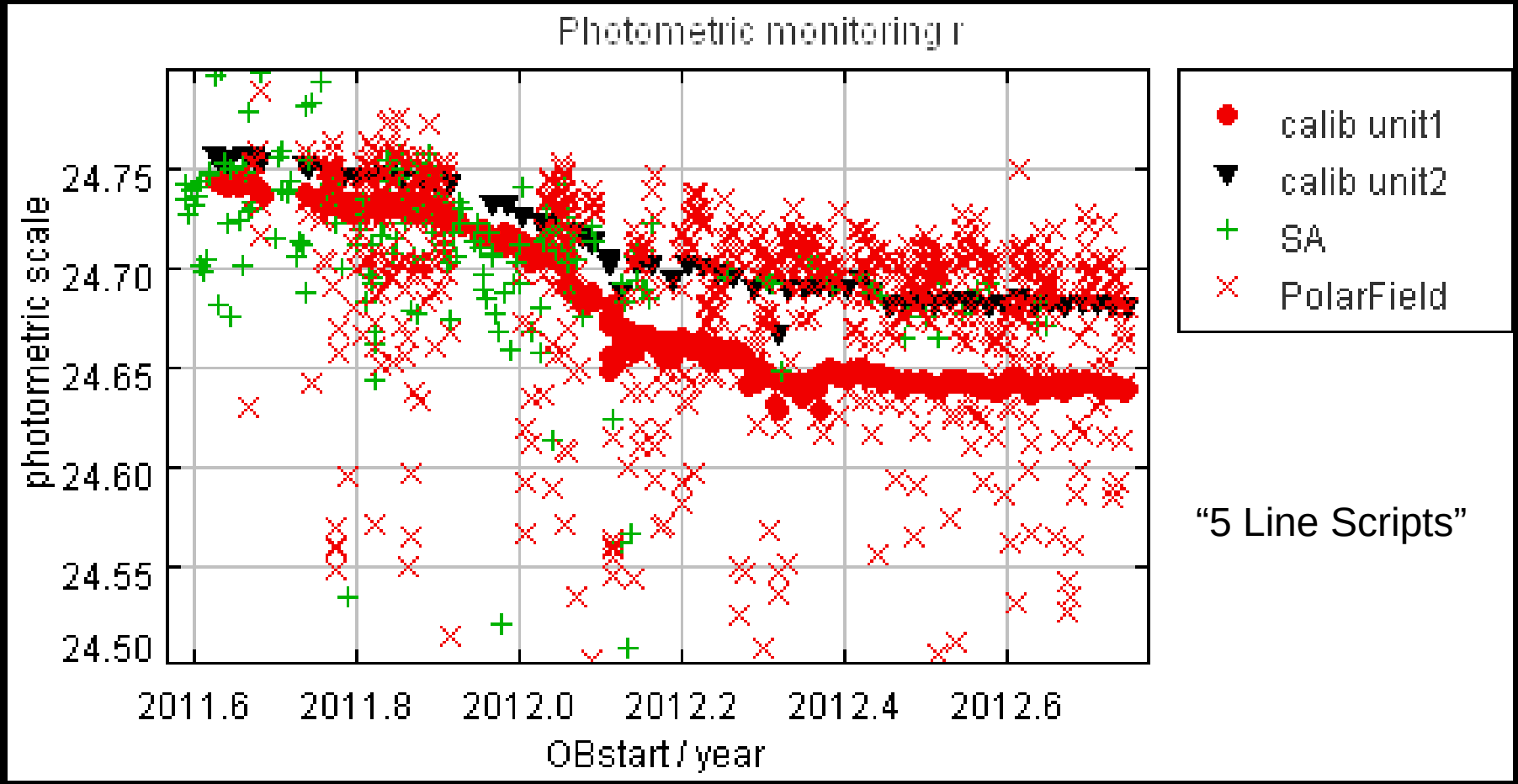
creation_date	2013-02-07 22:54:14
is_valid	128 good 0 bad
quality_flags	128 good 0 bad
SEEING	0.830
RMS	0.271
NREF	2280
SIG_DRA	0.187
SIG_DDEC	0.196

Quality: flags & timestamps

- Target.verify() #automated inspection
- Target.quality_flags #set by system
- Target.inspect() # User inspection
- Target.is_valid=value #set by user

  0,1,2 = bad,OK,Qualified - ready for delivery
- Calib.timestamp_start,end # validity time range

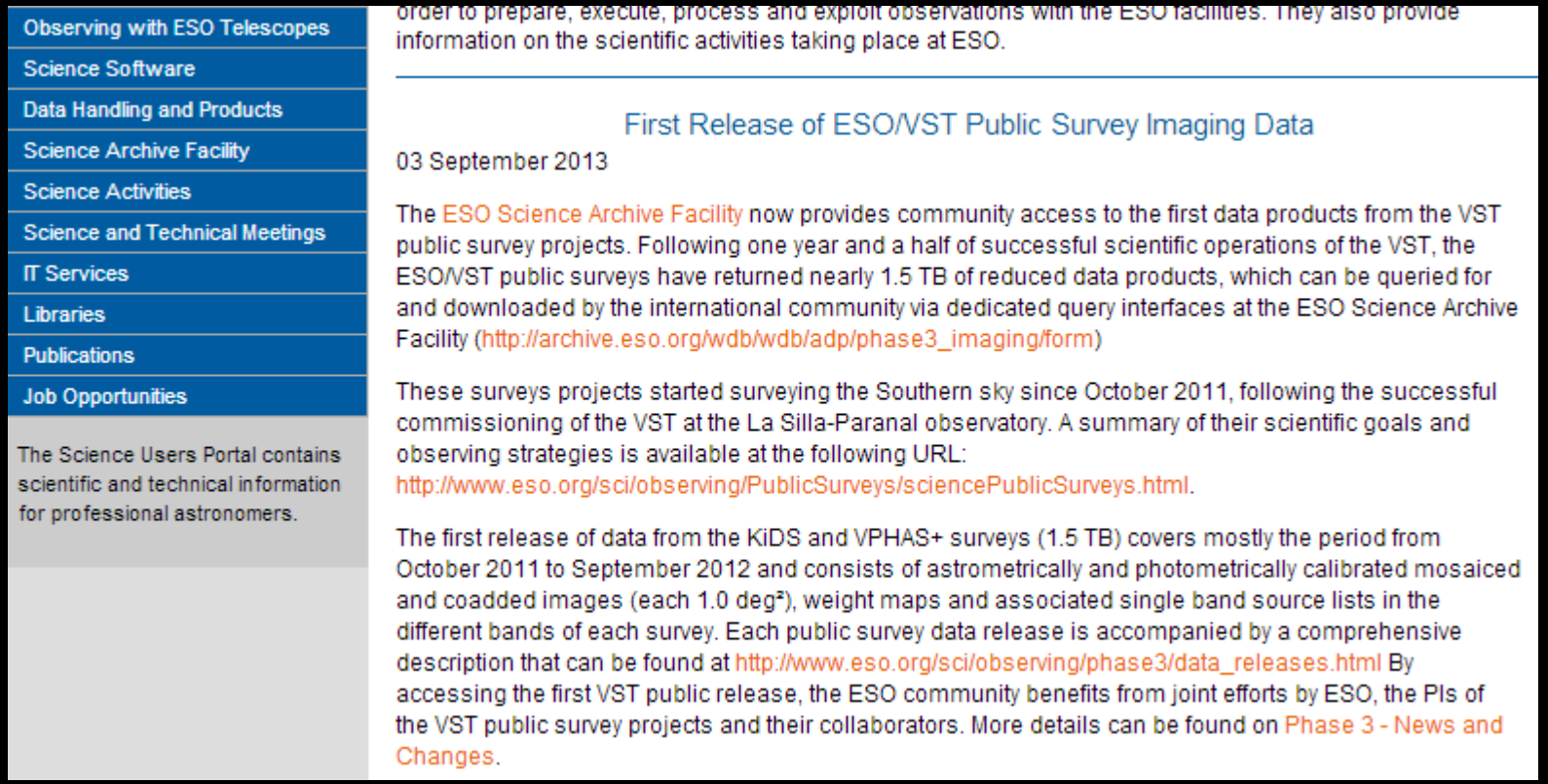
Calibrate the instrument not the data



"5 Line Scripts"

(See Hanuschik on Wed)

03 sep 13: KiDS DR1



- Observing with ESO Telescopes
- Science Software
- Data Handling and Products
- Science Archive Facility
- Science Activities
- Science and Technical Meetings
- IT Services
- Libraries
- Publications
- Job Opportunities

The Science Users Portal contains scientific and technical information for professional astronomers.

order to prepare, execute, process and exploit observations with the ESO facilities. They also provide information on the scientific activities taking place at ESO.

First Release of ESO/VST Public Survey Imaging Data

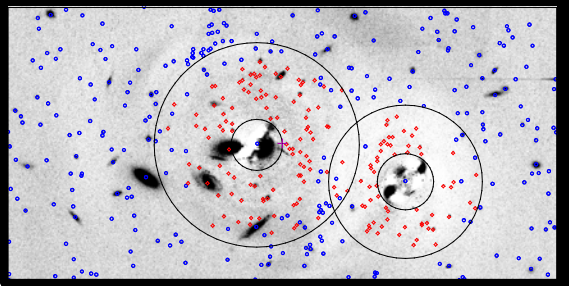
03 September 2013

The ESO Science Archive Facility now provides community access to the first data products from the VST public survey projects. Following one year and a half of successful scientific operations of the VST, the ESO/VST public surveys have returned nearly 1.5 TB of reduced data products, which can be queried for and downloaded by the international community via dedicated query interfaces at the ESO Science Archive Facility (http://archive.eso.org/wdb/wdb/adp/phase3_imaging/form)

These surveys projects started surveying the Southern sky since October 2011, following the successful commissioning of the VST at the La Silla-Paranal observatory. A summary of their scientific goals and observing strategies is available at the following URL: http://www.eso.org/sci/observing/PublicSurveys/sciencePublicSurveys.html.

The first release of data from the KiDS and VPHAS+ surveys (1.5 TB) covers mostly the period from October 2011 to September 2012 and consists of astrometrically and photometrically calibrated mosaiced and coadded images (each 1.0 deg^2), weight maps and associated single band source lists in the different bands of each survey. Each public survey data release is accompanied by a comprehensive description that can be found at http://www.eso.org/sci/observing/phase3/data_releases.html By accessing the first VST public release, the ESO community benefits from joint efforts by ESO, the PIs of the VST public survey projects and their collaborators. More details can be found on Phase 3 - News and Changes.

Science analysis with



- Morphometry (Galfit, GalPhot)
- Photometric redshifts
- Variability analysis (MDIA, VODIA)
- Advanced catalog handling

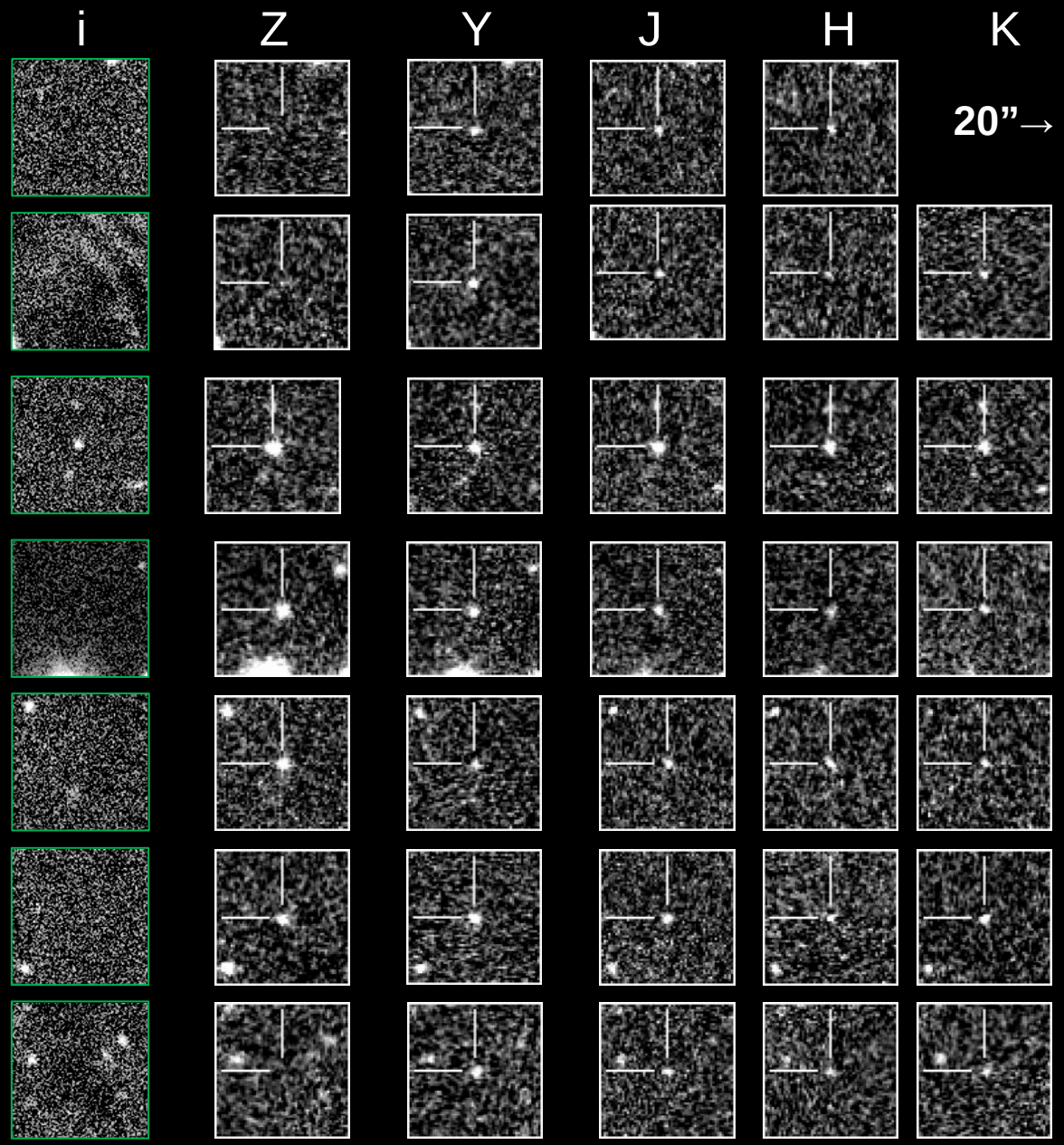
Query results for table GalFitSersic

Shown: 100 rows out of 901 entries, from project 'ALL'

SAMP: 1. Test Java 2. Connect to the hub 3. Broadcast VOTable Help SAMP

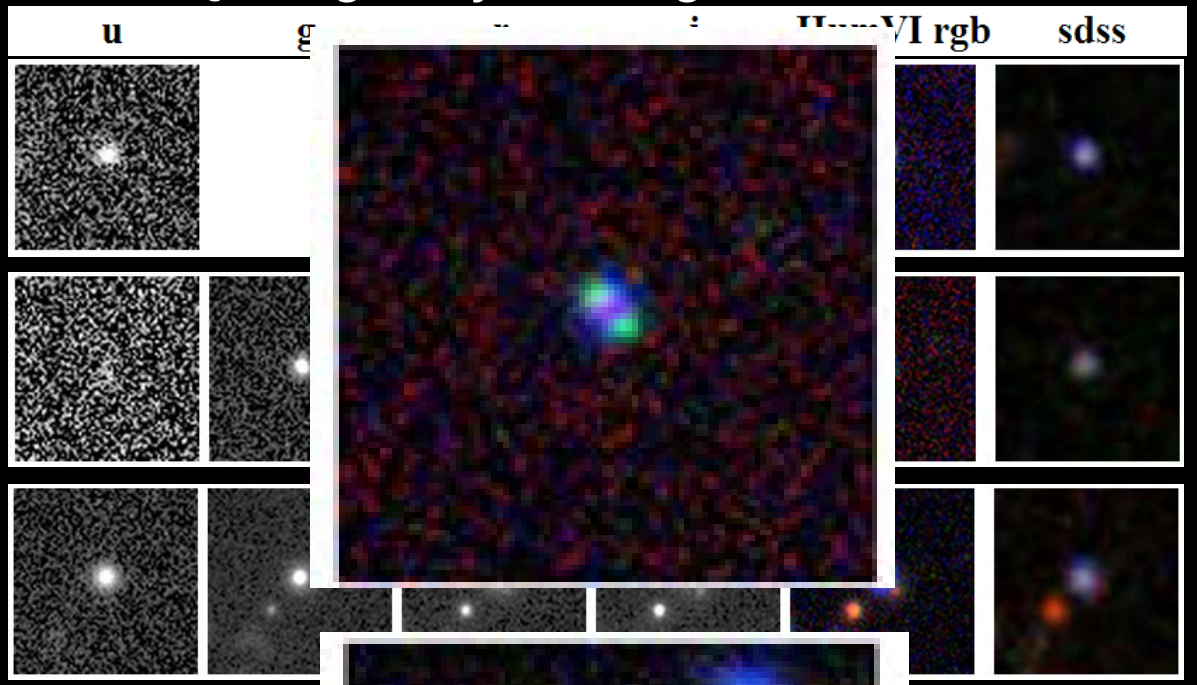
ROWNUM	project_id	quality view	+PRIVILEGES	object_id	re-process	creation_date	dmag [mag]	dN	dposang [deg]	dratio	dreff [pixel]	ds
1	1	quality view	4	object view	re-process	2008-07-23 09:29:22	0.26	0.76	9.54	0.13	8.44	0.0
2	1	quality view	4	object view	re-process	2008-07-23 09:29:22	0.25	0.64	27.21	0.32	0.24	0.0
3	1	quality view	1	object view	re-process	2007-12-11 12:40:03	0.01	0.01	1.14	0.0	0.06	0.0
4	1	quality view	1	object view	re-process	2007-12-11 12:39:59	0.01	0.01	0.64	0.0	0.05	0.0
5	1	quality view	1	object view	re-process	2007-12-11 12:39:12	0.01	0.01	8.89	0.01	0.05	0.0
6	1	quality view	1	object view	re-process	2007-12-11 12:39:12	0.01	0.01	5.3	0.01	0.05	0.0
7	1	quality view	1	object view	re-process	2007-12-11 12:39:08	0.01	0.01	1.09	0.0	0.07	0.0
8	1	quality view	1	object view	re-process	2007-12-11 12:39:08	0.02	0.03	2.28	0.02	0.18	0.0

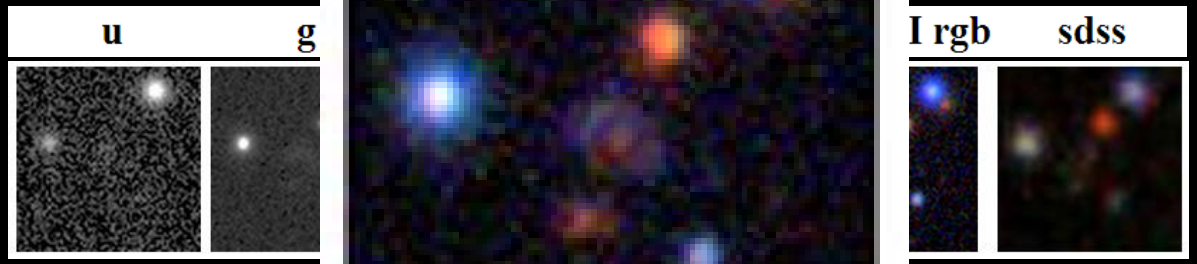
High redshift QSOs



Strongly-lensed QSOs

QSO-galaxy lensing candidates





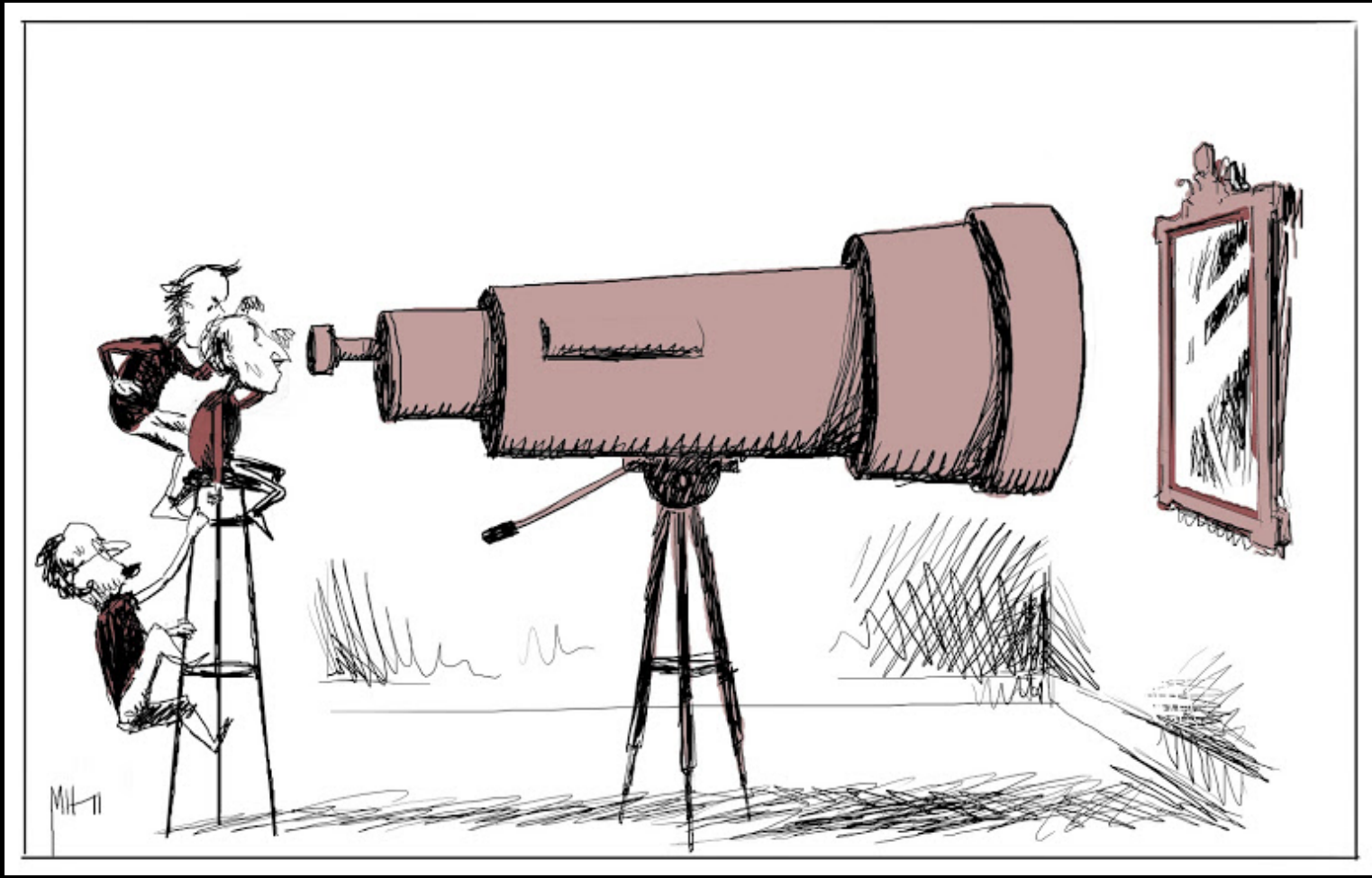
Courtesy C. Blokzijl

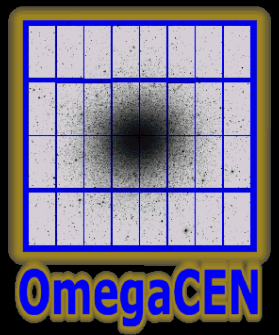
KiDS expected harvest

Strong lens type	2013	KiDS adds
QSO – galaxy	120	~600

Strong lens type	2013	KiDS adds
Galaxy -galaxy	**~200**	**~1000**

Looking ahead…





DFS expertise center

- **MUSE**: MUSE-WISE ready (see Brinchmann)
- **Euclid**: Mission Archive with ESAC,
  EXT data with Euclid-D
- **Gaia**: CU9 (archive) and visualization
- **MICADO**: Data Flow System Design lead **(E-ELT)**

- Target+RUG: Big Data R&D: visualization, databasing, storage (see Valentijn)

Concluding remarks

- Static Archive -> “3D Datacenter”
  - closed loop archive & pipelines
- “Data about data” + CDM = everything
- Pool SW/HW + resources supporting diverse projects
- Astronomy’s (IT) future is bright = ESO-surveys, ESO-MUSE, ESA-Gaia, ESA-Euclid, ESO-E-ELT

(Astro-)WISE in full depth

■ ■ ■