Projekte der BAV

BAV Beobachtertreffen Mai 2016

- **Neue Website**

  Im Wesentlichen abgeschlossen

  Admins gesucht

- **BAV Journal**

  5 Artikel veröffentlicht, 2 in der Begutachtung

  Gutachter gesucht

- **European Conference for Amateur Variable Star Observers**

  Vorträge gesucht

- **Herausforderungen durch Surveys**

  → Vortrag

Herausforderungen durch Surveys

Beobachtungsfelder der BAV im Kontext moderner Surveys

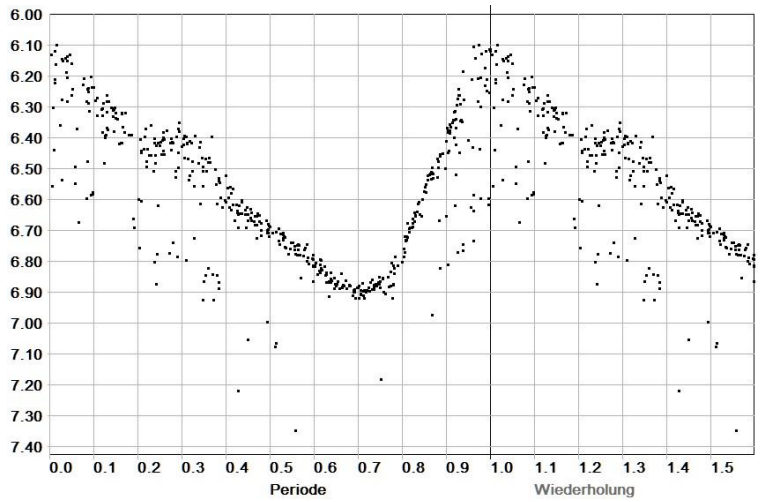
Vortrag zum BAV-Treffen

in Hartha im Mai 2016

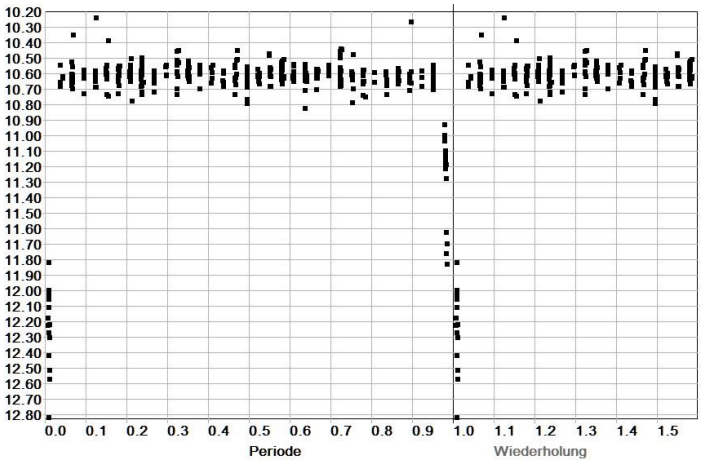
Lienhard Pagel

BAV-Programmsterne in Surveys beobachtet

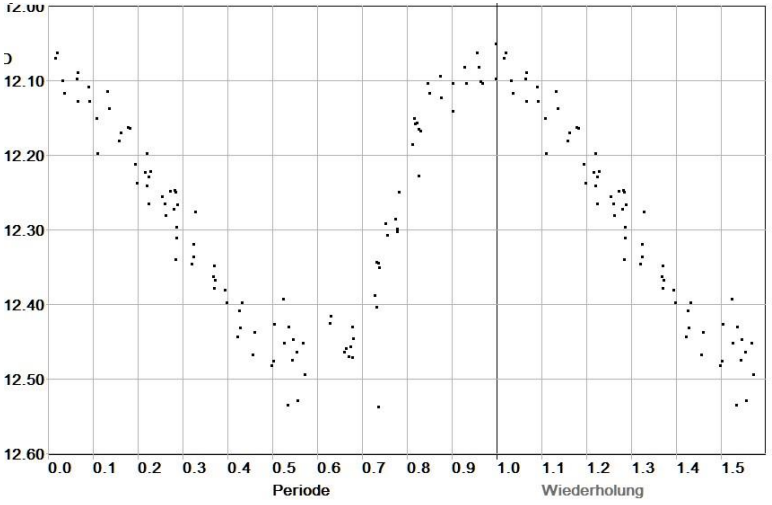
ASAS U Aql



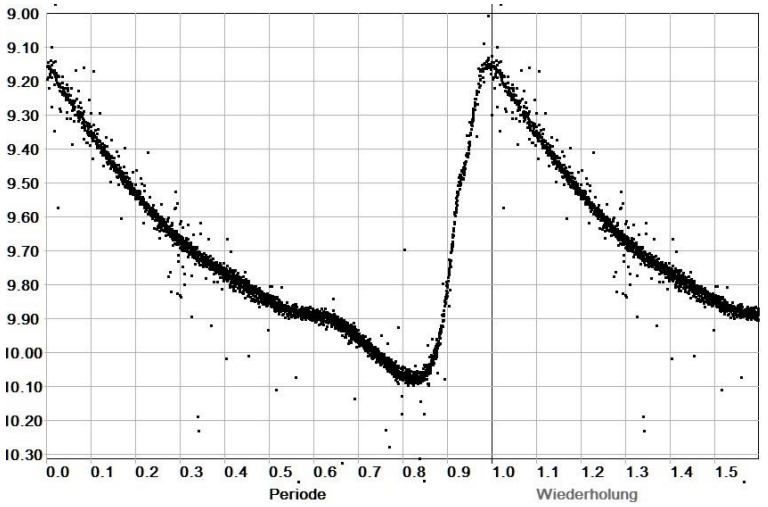
KWS SY And



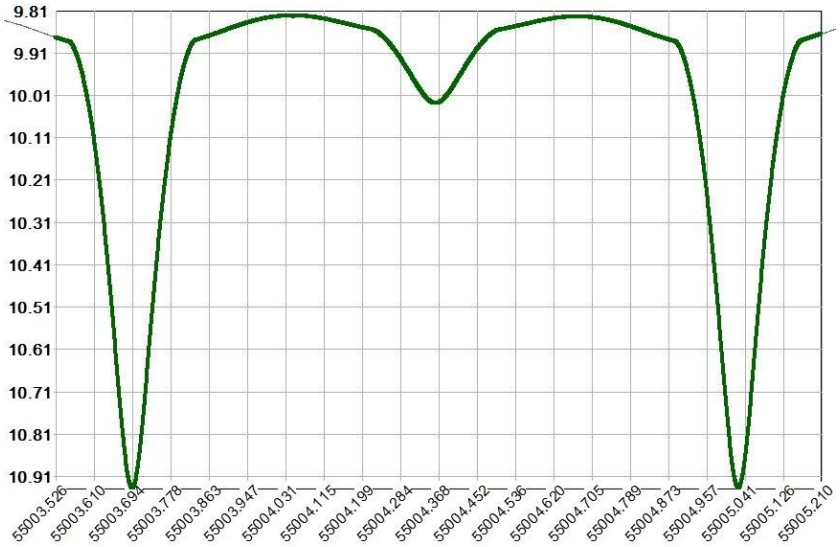
NSVS CQ Boo

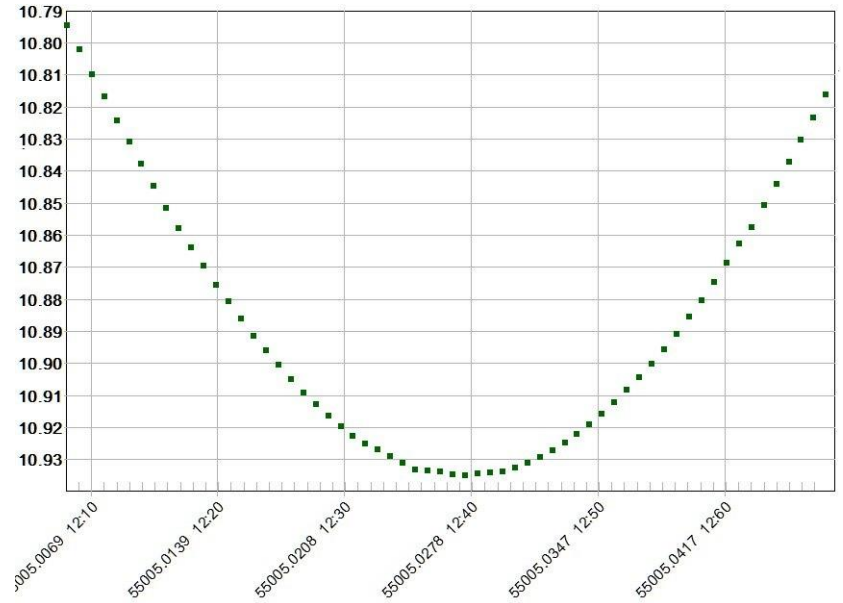


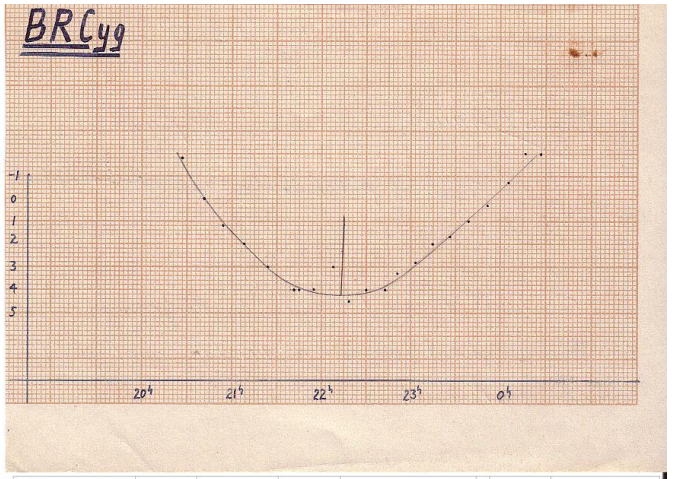
SWASP SW And



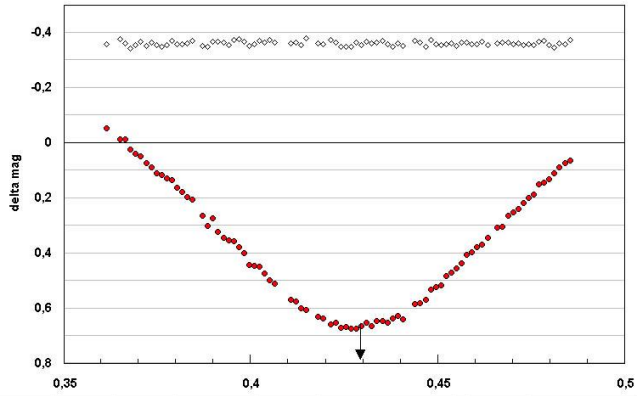
Kepler
BR Cyg







BR Cyg 2004-05-25 / 26



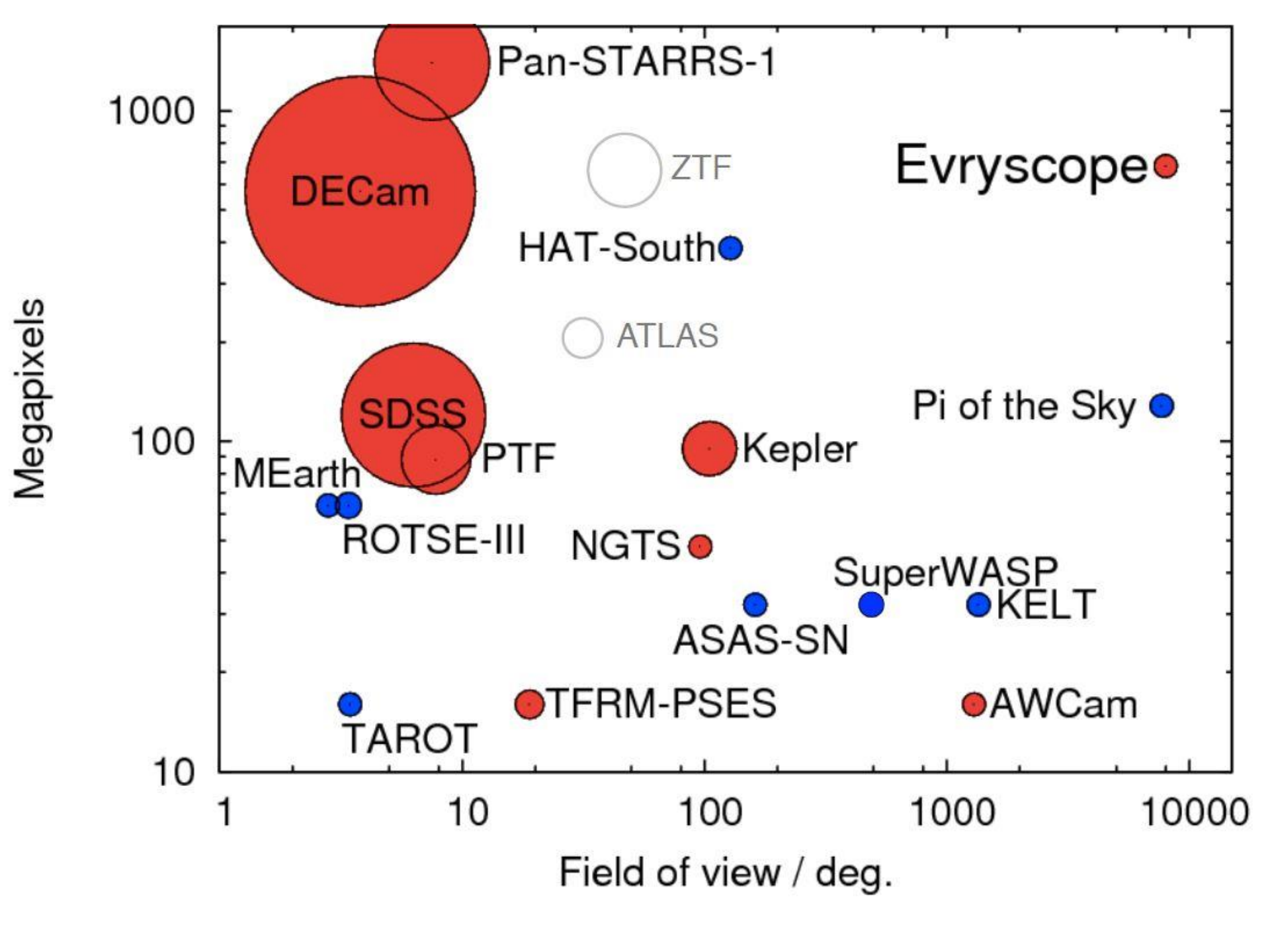
		JD geoz.	2453151 ,...	
Min I:	22:17:10	UT,	JD geo:	2453151,4286
			JD hel:	2453151,4293 ± 0,0001
Beobachter:		W. Quester (QU)		n = 82
Vergl-Sterne:		GSC 3557.208, GSC 3556.3310 = NSV 12304, dieser wird im NSV-Katalog als konst angegeben. In IBVS 4840 wird ebenfalls Konstanz während der Meßzeit festgestellt		
Instrument:		ST-7E mit V-Filter an 20 cm Cassegrain, f/6.4. Belichtg. 60 Sek.		
Dunst und leichte Zirren.				
Fotometrie mit AIP4WIN.		Auswertung: Grafische Symmetrierung und Kwee-Van Woerden..		

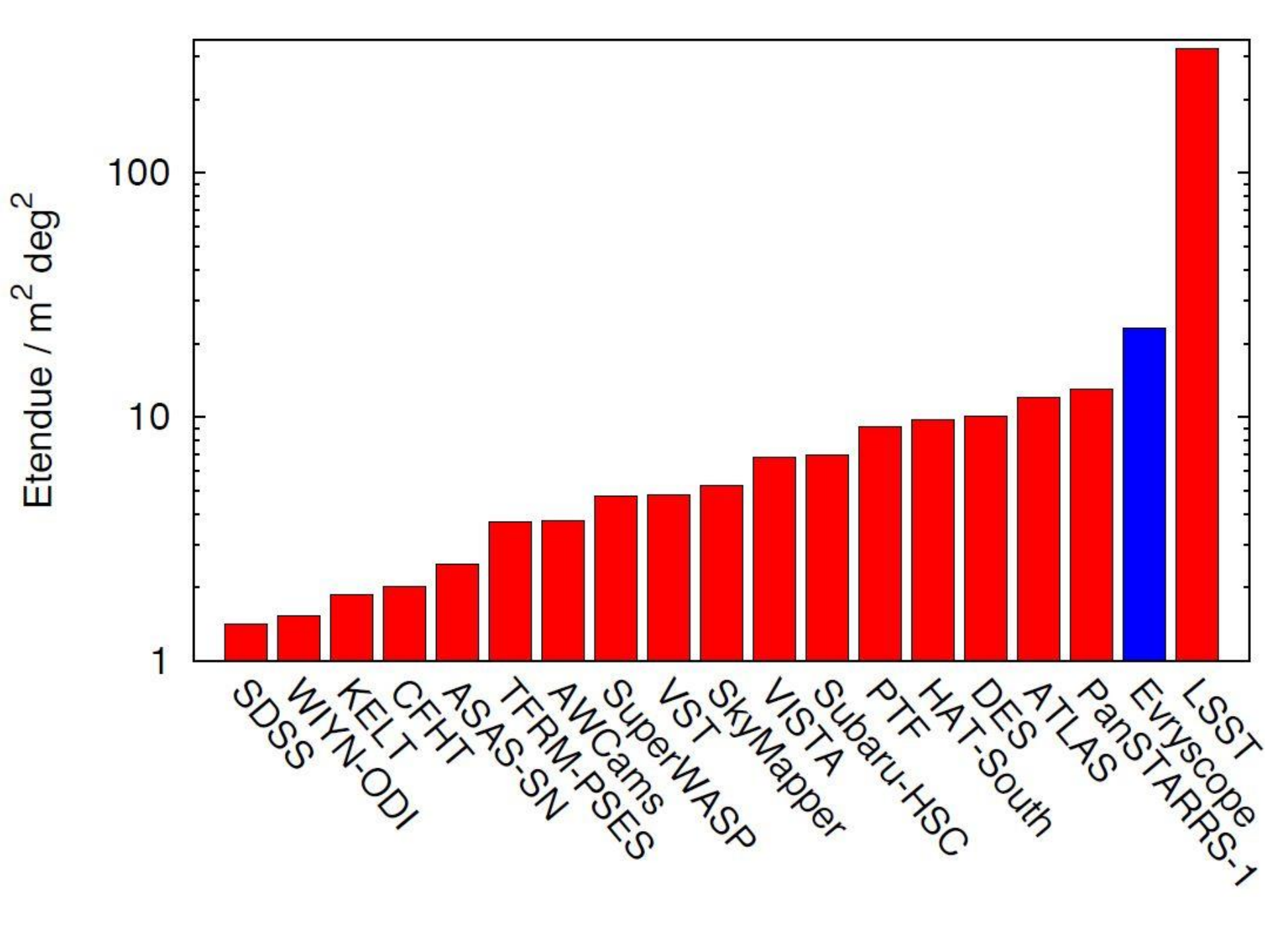
Die Rauten bei delta mag -0,4 zeigen die Differenz zwischen den Vergleichssternen (+ Konstante). Mittlerer Fehler der Einzelmessung ±0,008 mag. Zumindest während meiner Messungen

Laufende Surveys

Eine unvollständige Übersicht

Mai 2016


Pan-STARRS-1
DECam
ZTF
Evryscope
HAT-South
ATLAS
SDSS
Pi of the Sky
PTF
Kepler
MEarth
ROTSE-III
NGTS
SuperWASP
KELT
ASAS-SN
TFRM-PSES
AWCam
TAROT
1000
100
10
1
10
100
1000
10000
Megapixels
Field of view / deg.


Etendue / m^2 deg^2
100
10
1
SDSS
WIYN-ODI
KELT
CFHT
ASAS-SN
TFRM-PSES
AWCams
SuperWASP
VST
SkyMapper
VISTA
Subaru-HSC
PTF
HAT-South
DES
ATLAS
PanSTARRS-1
Evryscope
LSST

Evryscope

Every year:
35,000 observations of ~20 million targets

V=16.4 every 2 minutes
V=18 every hour
3 mmag every 15 min. @ V=12

Hi Lienhard,

thanks for contacting me -- we are not releasing Evryscope data generally yet,
but we look forward to being **able to share it with the community in the next year or two**,
if we can obtain the funding to do so.

Cheers, Nick

The Evryscope:

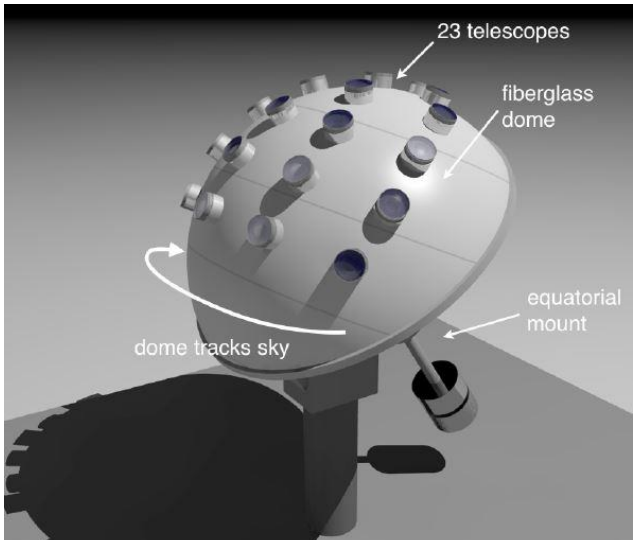
the first full-sky gigapixel-scale telescope

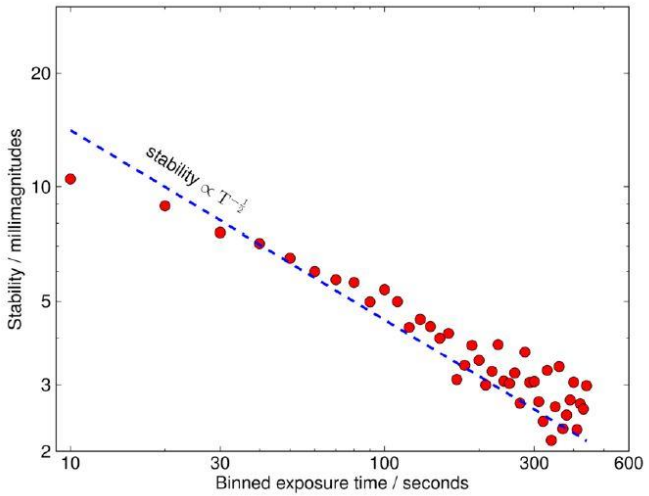
The Evryscope instrument on a German equatorial mount.

This example 1.2m-wide dome contains 23 separate 7cm telescopes, delivering a 9060-square-degree instantaneous field of view.

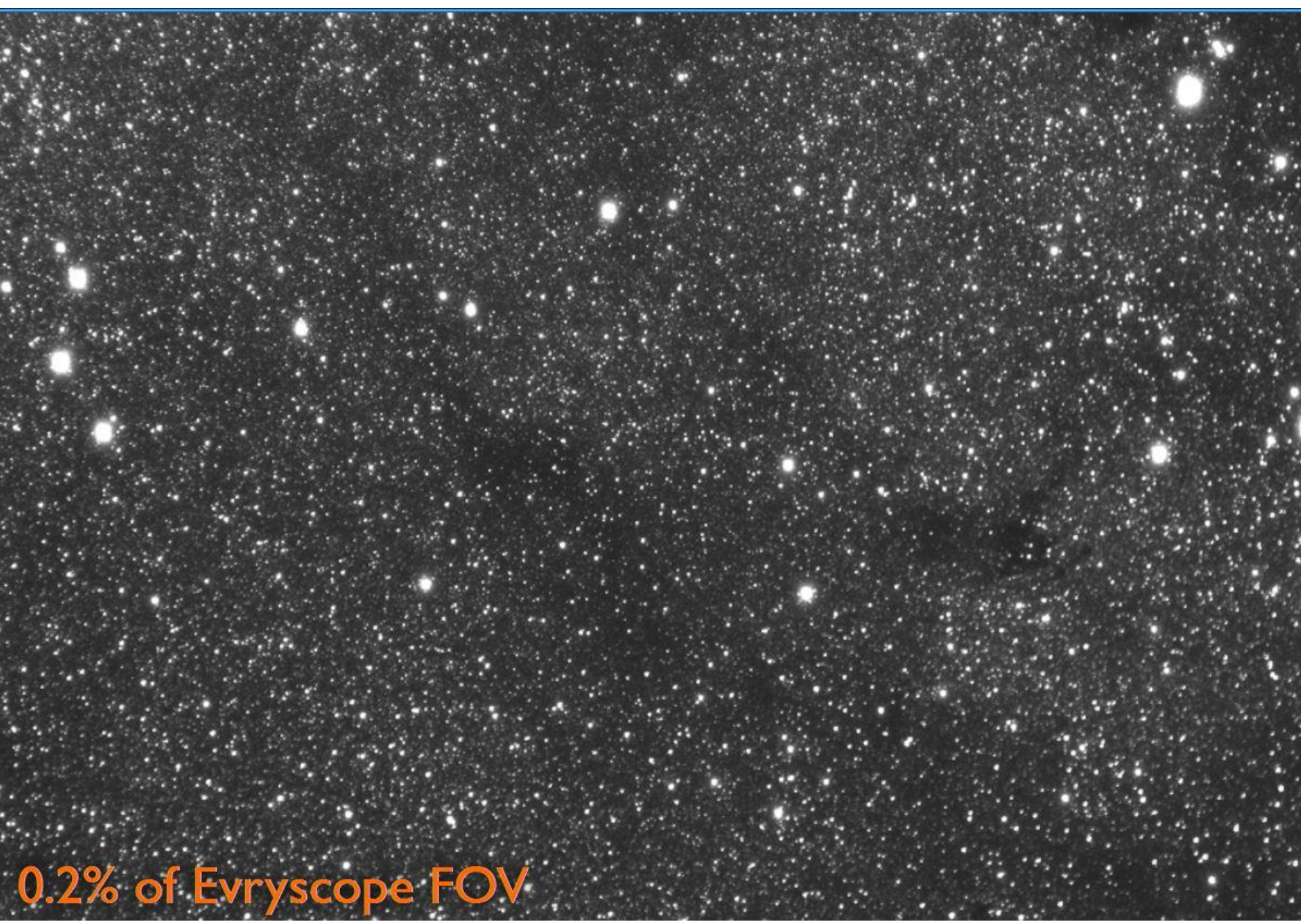
The concept easily scales to larger apertures and improved sky sampling.

Gesichtsfeld einer Kamera: 25,4° x 18°





1. two-minute-cadence multi-year light curves for every star brighter than V=16.5
2. millimagnitude minute-cadence photometry for every star brighter than V=12
3. minute-by-minute record of all events in the sky down to V=16.5
4. V=19 in one-hour integrations; every part of the sky observed for at least 6.5 hours per night.


0.2% of Evryscope FOV

Evryscope Pipeline

1. Evryscope

~0.8Gb/2min

2. CCD calibration

- Pixel non-linearity
- Masterdark substraction & Masterflat division
- Image masking

Telescope pointing coordinates

3. Astrometric reduction

- `Astrometry.net`
- WCS TAN-SIP to TAN-TPV conversion
- `SExtractor` positions & photometry
- Testing astrometric reduction

4. Light curves

Single-night light curve computation

- Source association
- Differential photometry from a subset of reference stars whose RMS is minimum
- Magnitude residuals fitting to a (x,y) polynomial
- Light curve detrending (`SysRem, TFA`)

Multi-night light curves

- Signature detection
- Phase folding (`Lomb-Scargle`)

Database

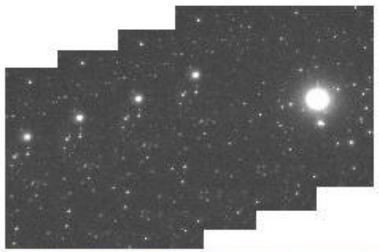
Store images, light curves, and catalogs

100 Tb NAS running `PostgreSQL`

Astronomers

SCIENCE with collaborators!

Deliverables



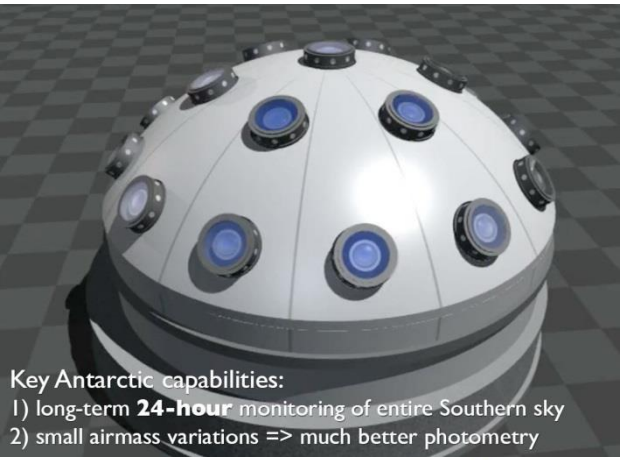
WCS Image cutouts around a target and time range

Multi-night light curves

Targets

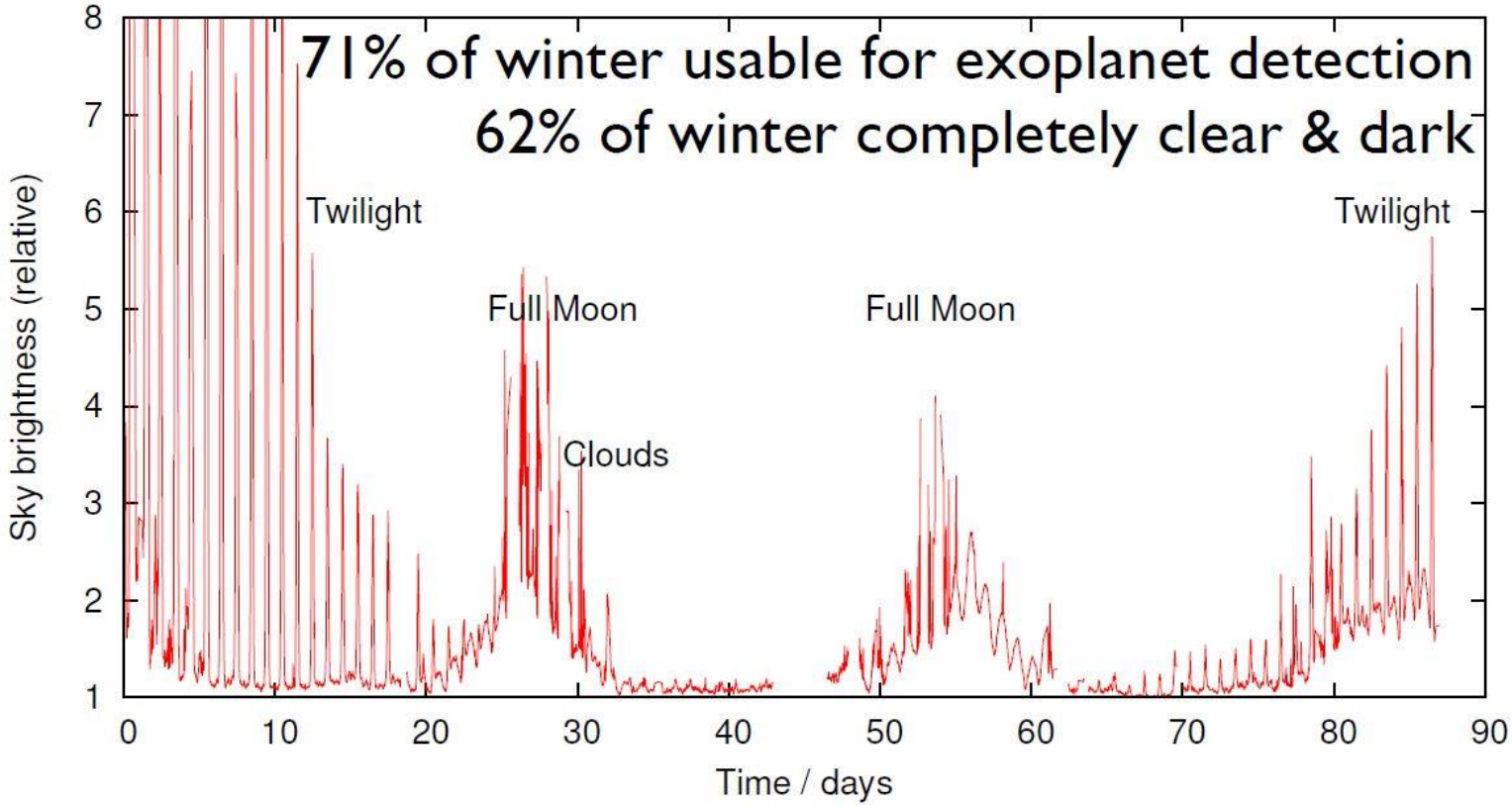
Catalogs of targets to monitor

The Antarctic Evryscope

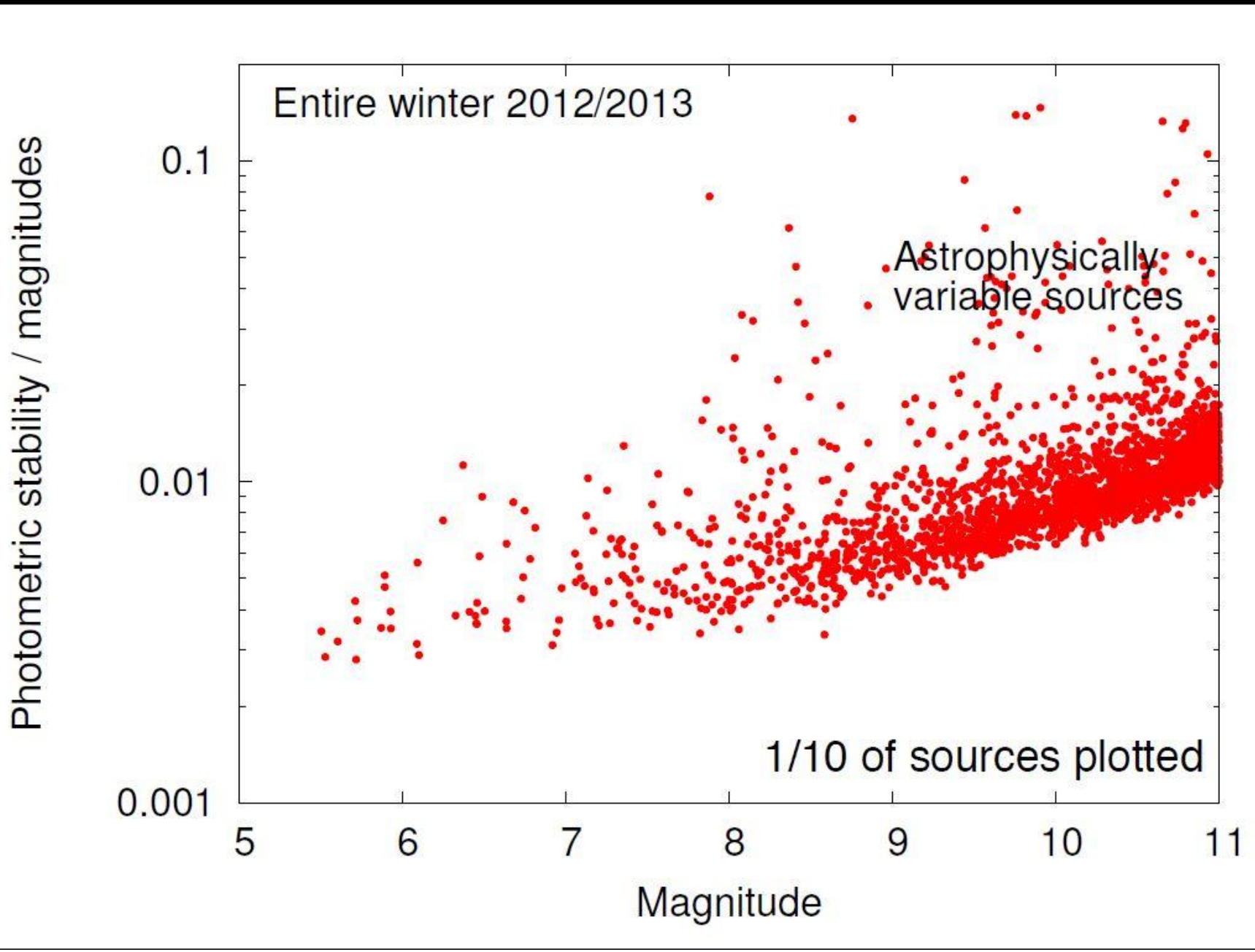


The Antarctic Evryscope:
Continuously Observing the
Entire Southern Sky

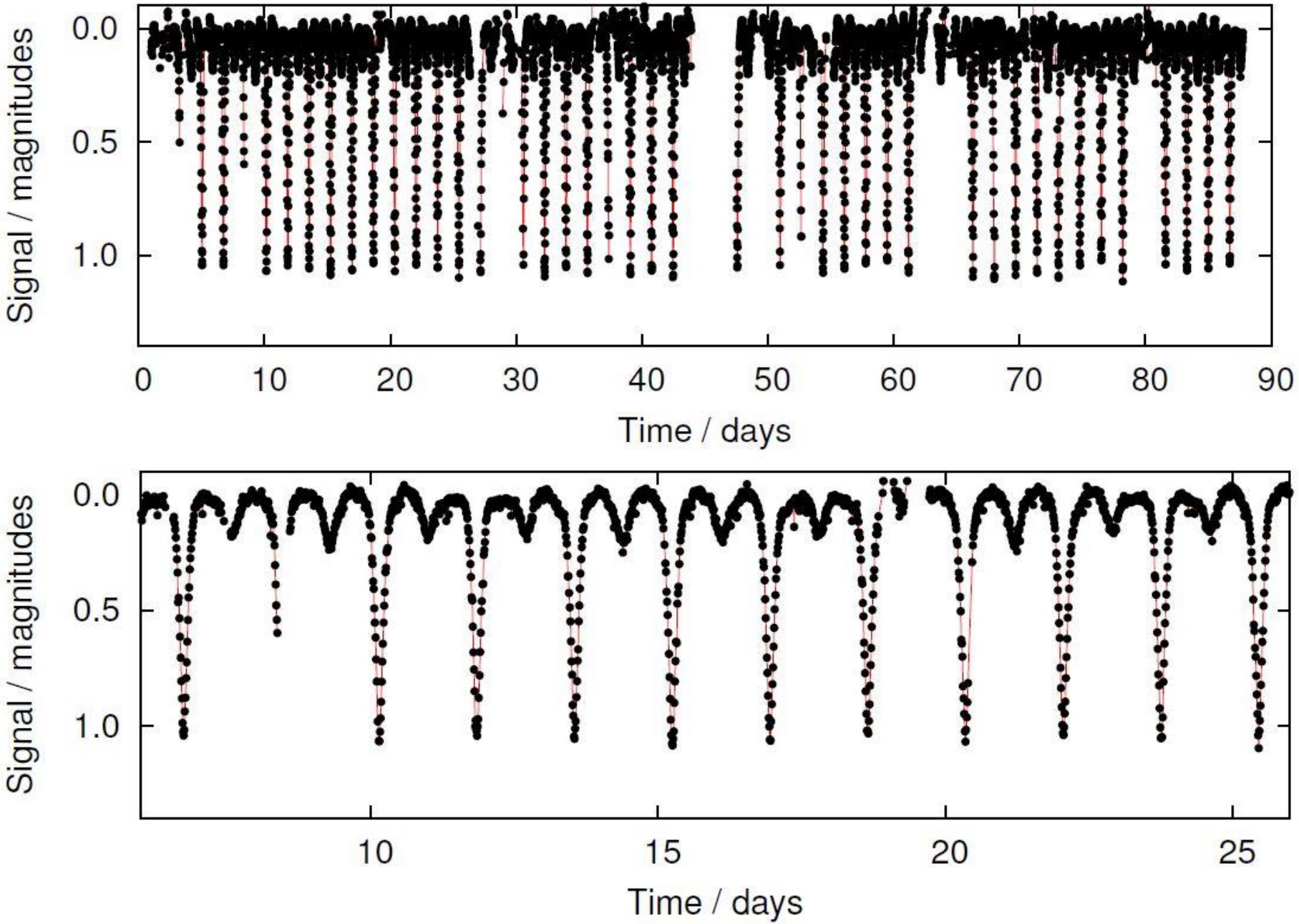
Nicholas Law
Octavi Fors (Software lead),
Jeff Ratzloff, Daniel del Ser
Philip Wulfken, Dustin Kavanaugh
University of North Carolina, Chapel Hill



Photometric quality



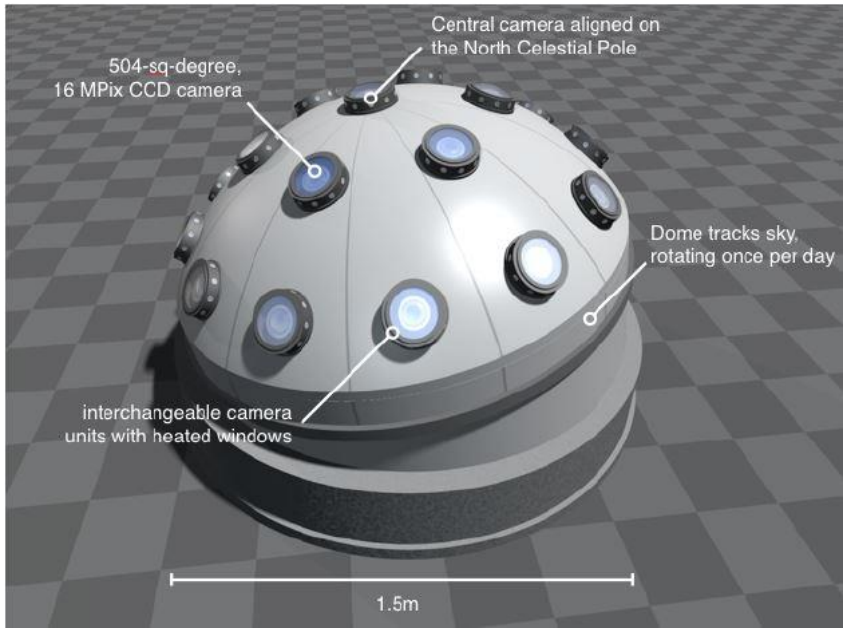
W UMi eclipsing binary

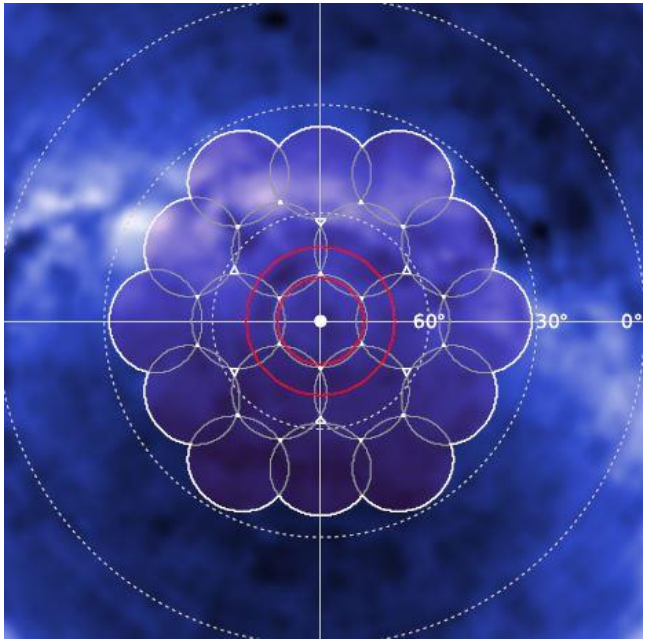


AWCams

Das System AWCams:
High Canadian Arctic Planet-Search Telescopes

- Das System ist im Norden Grönlands installiert
- 20 Kameras mit 7 cm Optik f/1.2





Compound Arctic Camera System (CATS).

THE FIRST WIDE-FIELD SURVEY AT 80N

THE SPECIFICATIONS OF THE AWCAM SYSTEMS

Survey characteristics	
Pointing	North Celestial Pole
Survey dates	14 February 2012 – 21 February 2012
Survey length (total)	152 hours
Survey length (dark and clear)	98 hours
Data collected	44,583 images (1.36 TB)
CCD Hardware	
CCD	4096^2 front-illuminated (KAF-16803)
Peak CCD Quantum Efficiency	59%
Pixel size	9μm
Readout time	4s
85mm camera	
Camera lens	Canon EF 85mm f/1.2L II USM
Field dimensions	25.4 × 25.4 degrees
Continuous-coverage field	504 square degrees
Pixel scale	22.3"/pixel
Image quality	2-5 pixel FWHM over entire field
Filters	Clear, g, r, i, z
50mm camera	
Camera lens	Canon EC 50mm f/1.2L USM
Field dimensions	40.8 × 40.8 degrees
Continuous-coverage field	1295 square degrees
Pixel scale	35.9"/pixel
Image quality	2-5 pixel FWHM over entire field
Filters	Clear, g, r, i, z

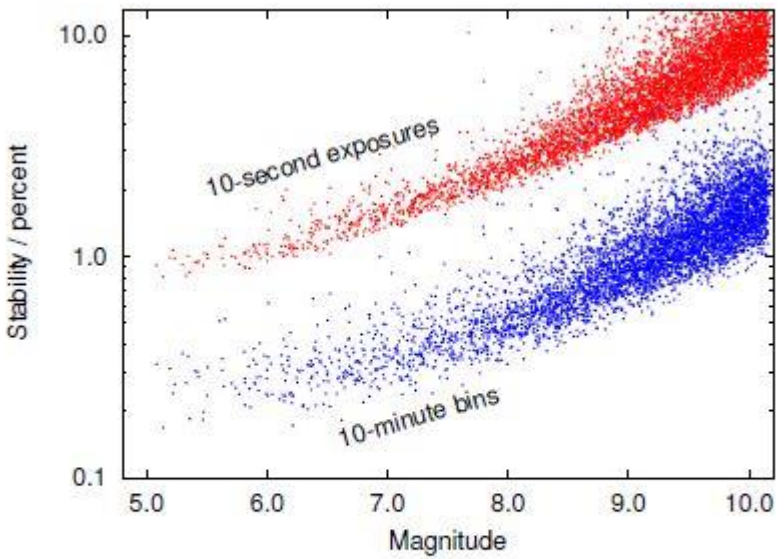


FIG. 6.— The photometric precision achieved for the 5,283 bright stars in the 50mm camera field of view. The red points show the RMS variations in the measured photometry across the 2801 individual photometric data points taken for each star over 12 hours of operations. The blue points show the stability when binned down to 10-minute (60 datapoint) chunks.

1% = 0.01 mag

Preprint typeset using LATEX style emulateapj v. 5/2/11

EXOPLANETS FROM THE ARCTIC: THE FIRST WIDE-FIELD SURVEY AT 80N

Nicholas M. Law1, Raymond Carlberg2, Pegah Salbi2, Wai-Hin Wayne Ngan2, Aida Ahmadi3, Eric Steinbring4, Richard Murowinski4, Suresh Sivanandam1, Wolfgang Kerzendorf2

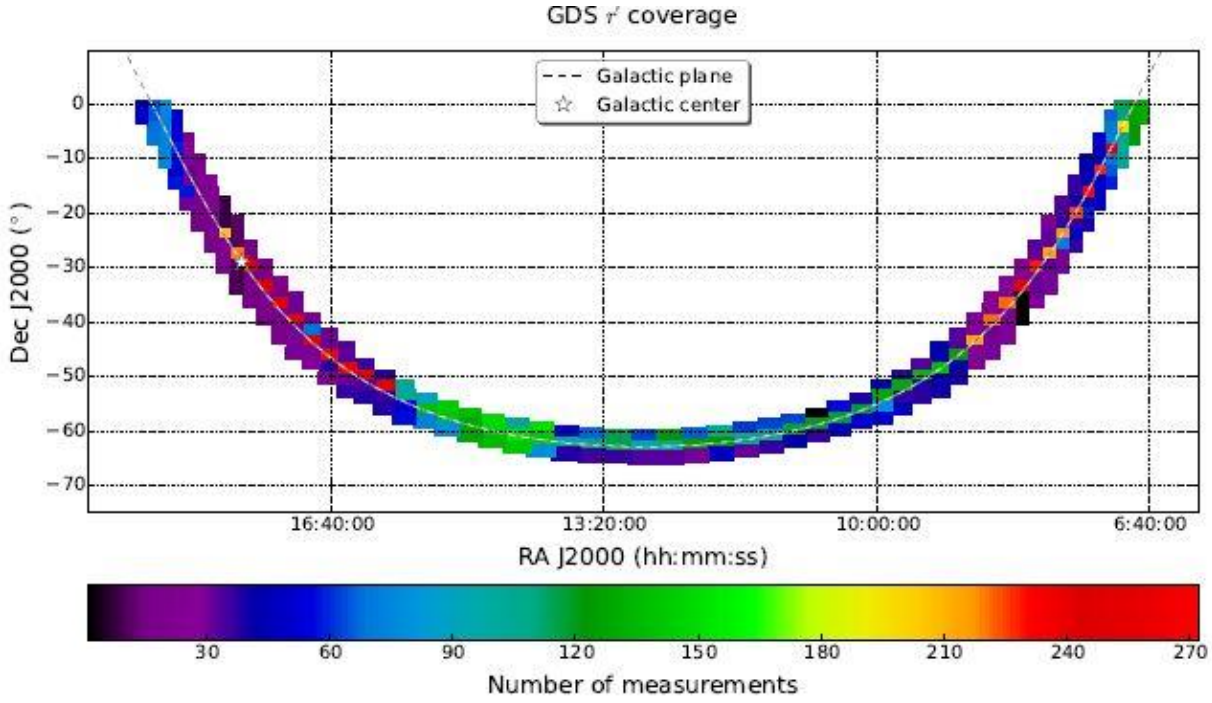
Draft version March 9, 2016

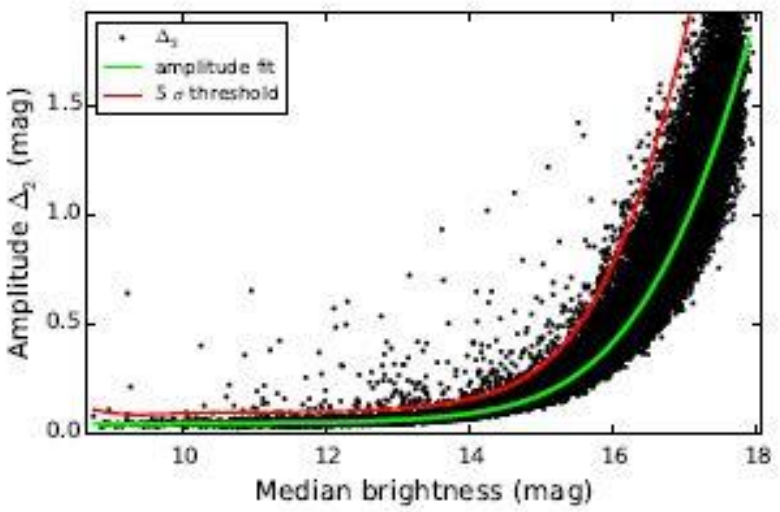
GDS

The Bochum Survey of the Southern Galactic Disk (GDS)

Rundbriefbeitrag Stefan Hümmerich und Klaus Bernhard

- Monitoring eines 6 Grad breiten Streifens entlang der galaktischen Ebene
- robotisches 15 cm Zwillingsteleskop
- Sloan Filtern r′ und i′
- 8 mag < r′ < 18 mag
- 7 mag < i′ < 17 mag
- Winkelauflösung von etwa 3''





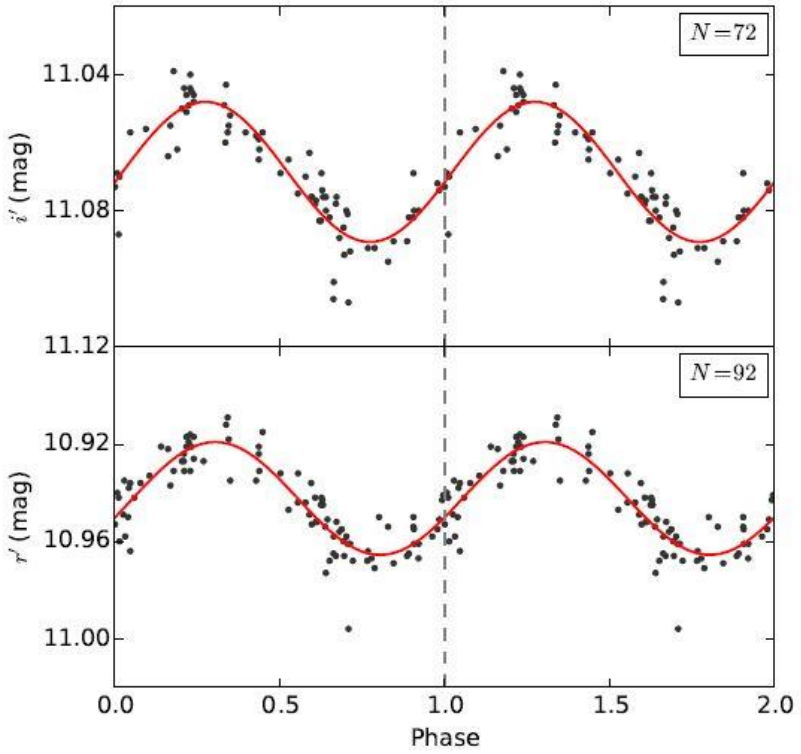


Fig. 5 V 851 Mon, a known variable with $P = 0.3323$ d and a scatter-corrected amplitude of 0.046 mag in r' and 0.041 mag in i', respectively; VSX lists an amplitude of 0.05 mag. The maximum amplitudes are $A = 0.087$ mag in r' and $A = 0.068$ mag in i'.

Astronomische Nachrichten, 10 August 2015

The Bochum Survey of the Southern Galactic Disk:
II. Follow-up measurements and multi-filter photometry for 1323 square degrees monitored in 2010 – 2015

MoritzHackstein1,⋆, Christofer Fein1,Martin Haas1,Michael Ramolla1, Francisco Pozo Nu˜nez1, Angie Barr Dom´ınguez2,

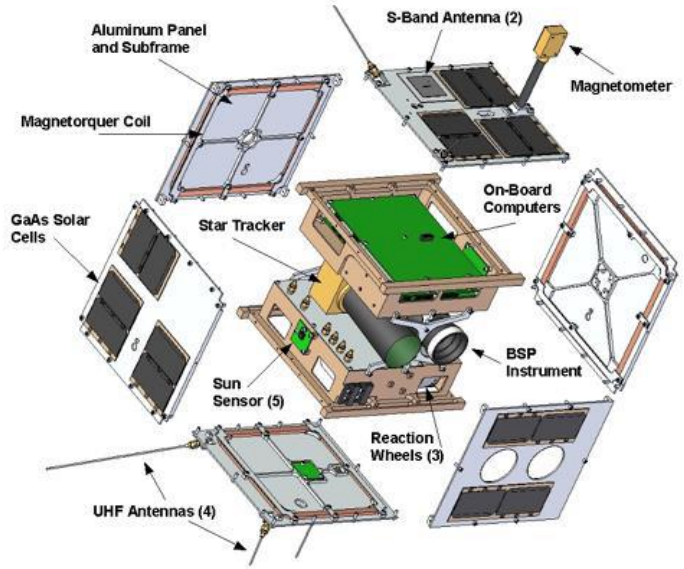
BRITE

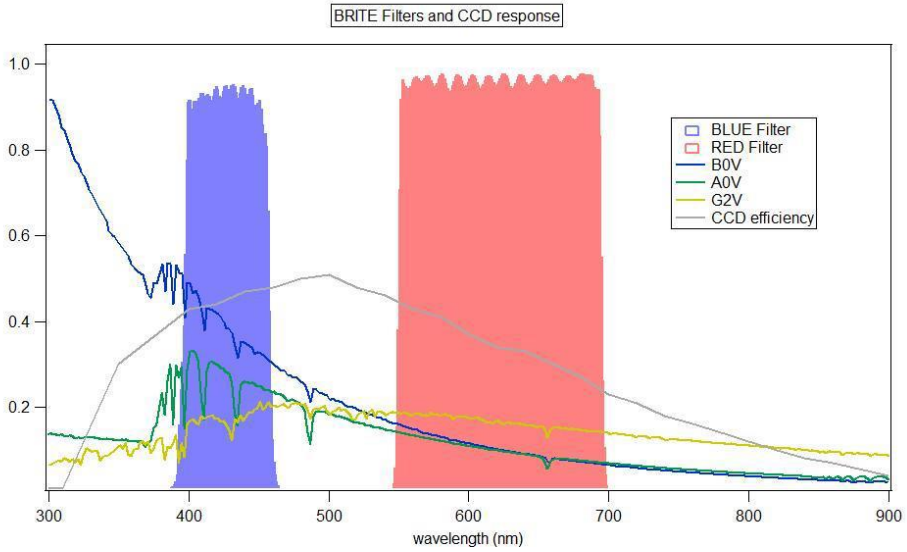
http://brite-constellation.at/

BRITE-Constellation Photometry

*BRITE = **BR**ight **T**arget **E**xplorer.*

- Ein **Netzwerk von 6 Nano-Satelliten** zur Untersuchung der Eigenschaften von hellen Sternen
- 3 cm Optik mit einem 24 Grad Gesichtsfeld und ein Kodak Sensor aKAI 11002-M
- Der Magnituden-Bereich reicht von 0 bis 7.
- Bei 0 – 4 mag soll die Streuung der Messwerte kleiner als 0,001 mag sein,
- Bei 6 mag immer noch 0,003 mag.





20 cm lang, 8 kg, 800 km Höhe,

The first results have been published (e.g. Baade et al., 2016, Pigulski et al., 2016, Weiss et al., 2016).
The participation of other astronomers including amateurs in ground-based support observations is very much welcome.

M. ZEJDA1, E. PAUNZEN1, Z. MIKULÁŠEK1
BRITE – constellation, Project of astronomical nanosatellites, OEJV January 2016,

6 Nanosatelliten:

UniBRITE Universität Wien	25. Febr. 2013, Sriharikota, Indien
BRITE-Austria TU Graz	25. Febr. 2013
BRITE-PL-1 polnischer Satellit	21. Nov. 2013
BRITE-PL-2	19. Aug. 2014
BRITE-CA-1 kanadischer Satellit	19. Jun. 2014
BRITE-Ca-2	19. Jun. 2014

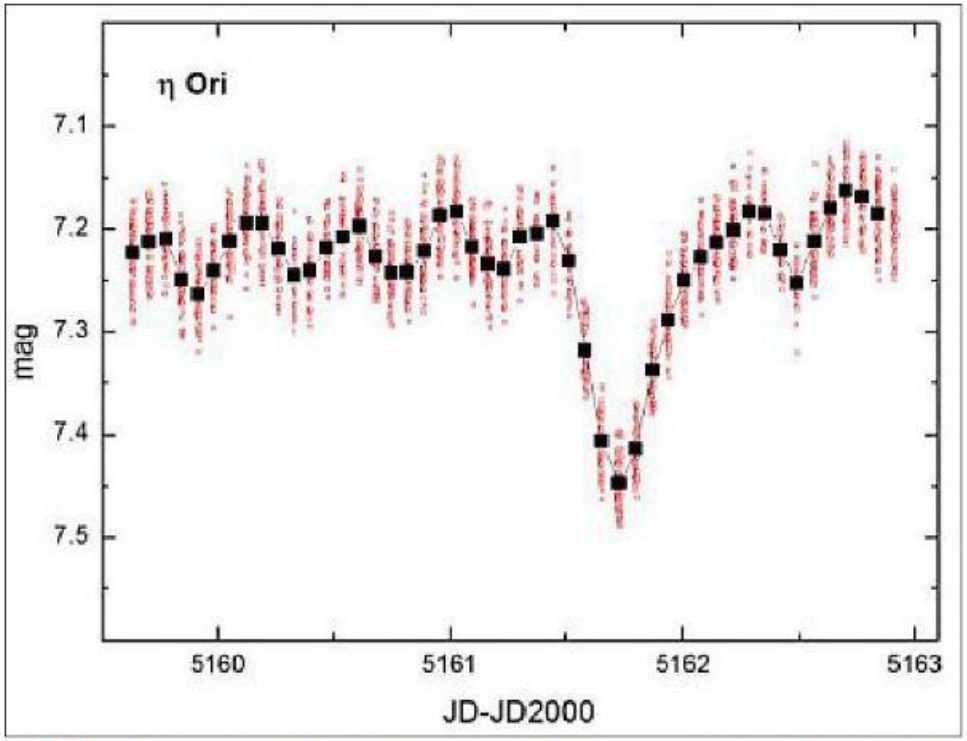


Figure 13: Light curve from Eta-Orionis, from UniBRITE data (image courtesy of Rainer Kuschnig, University of Vienna). The large black squares are the means of the vertical groups of small red squares. The light curve is entirely consistent with simultaneous observations from MOST on the same star (image credit: University of Vienna, UTIAS/SFL)

https://directory.eoportal.org/web/eoportal/satellite-missions/b/brite-austria

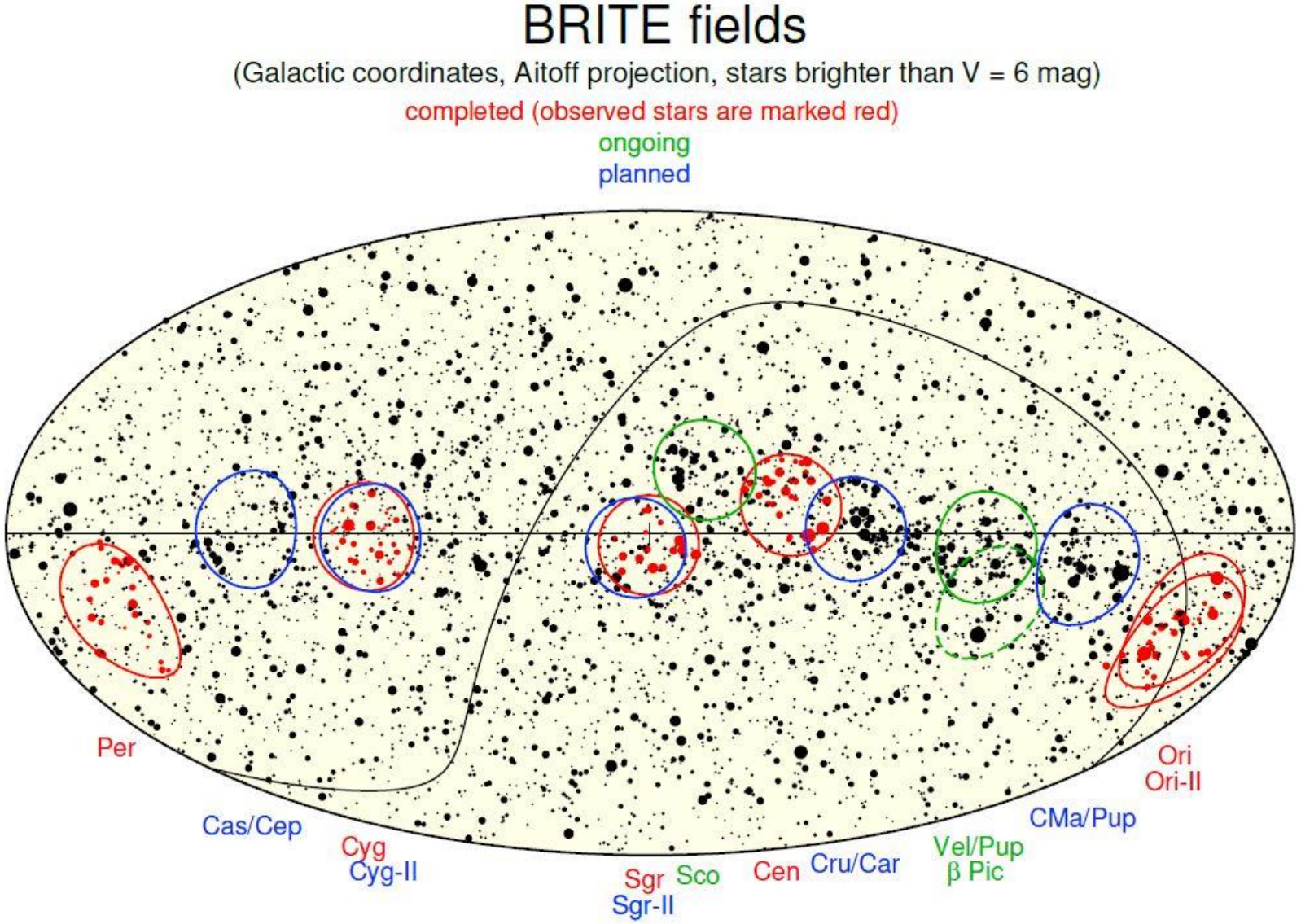


Figure 2: Location of BRITE fields in the sky. The curved line is the celestial equator.

Analysis of BRITE data—a cookbook, Version 1.6
Andrzej Pigulski, pigulski@astro.uni.wroc.pl, June 14, 2015
http://brite.craq-astro.ca/doku.php?id=start

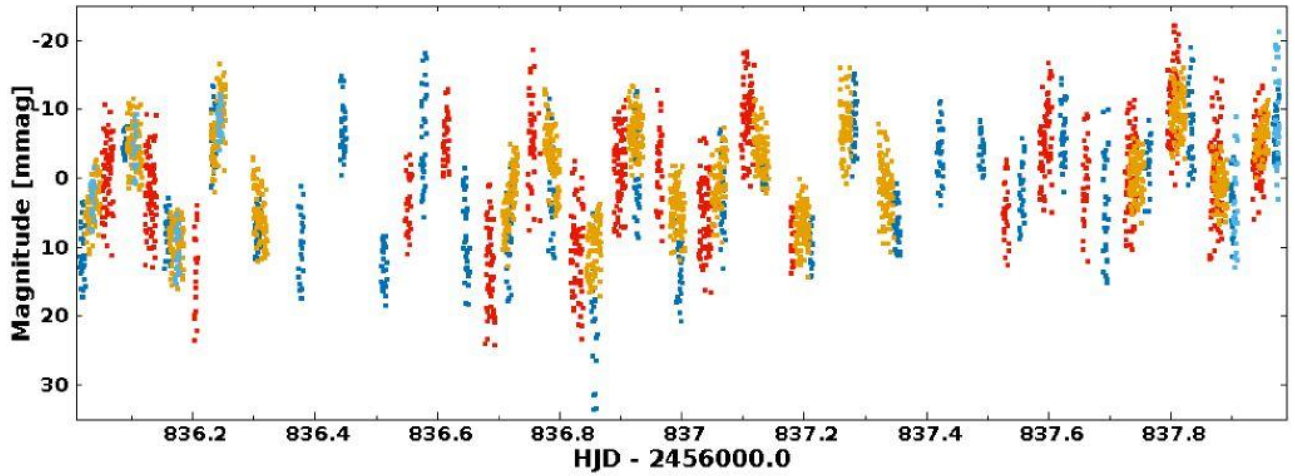


Figure 20: A two-day fragment of the combined data of ϵ Cen from four BRITE satellites. The colour coding is the following: dark blue: BAb, light blue: BLb, red: UBr, orange: BTr.

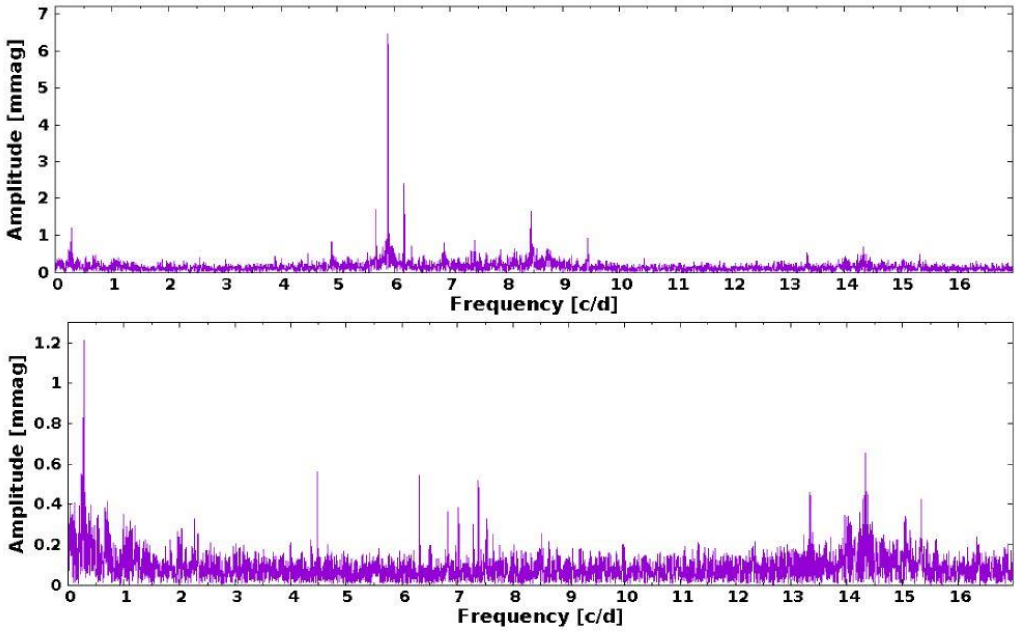


Figure 21: Top: Original spectrum of the combined blue- and red-filter data for ϵ Cen. Bottom: The same after prewhitening of the three strongest modes.

BRITE-Constellation Ground Based Observations Team (GBOT)

AAVSO nimmt an GBOT teil.
https://www.aavso.org/aavso-brite-targets

AAVSO Brite Targets

Targets for period April 16 - September 16 — coordinated by Konstanze Zwintz (konstanze.zwintz@uibk.ac.at)

photometry — priorities according to observability

spectroscopy

Star	RA (2000.0)	DE (2000.0)	V [mag]	spectral type	Priority	scientific background	type of data needed	BRITE contact	contact email address
Beta Lyr	18:50:04.795	+33:21:45.61	3.4 max	B8.5Ib-II pec	1	eclipsing binary: intrinsic variability on top of regular eclipsing variations	better than 0.01 mag, multicolor time resolved photometry, preferably BVR, time resolution a few min (not lower than 10 mins)	Slavek Rucinski	rucinski@astro.utoronto.ca
			~0.55 var		1	variations in broad emission lines	spectroscopy, any resolution: medium/high -> RV, low -> emission lines may lead to independent publication		
55 Cyg	20:48:56.3	+46:06:50.9	4.86	B4 Ia	2	blue supergiant	time resolved spectroscopy time resolution better than 30 minutes	Gerald Handler	gerald@camk.edu.pl
mu Nor	16:34:05.2	-44:02:43.13	4.94	O9.7 Iab	2	pulsating variable star	time resolved spectroscopy time resolution better than 30 minutes	Gerald Handler	gerald@camk.edu.pl
alpha Lyrae (Vega)	18:36:56.3	+38:47:01.3	0.03	A0Va	2	pulsating variable star	time resolved photometry in known passbands like Johnson, Geneva, Stromgren, Walraven; time resolution 15 minutes or better time resolved spectroscopy; time resolution better than 15 minutes	BRITE GBOT	konstanze.zwintz@uibk.ac.at
lambda Scorpii	17:33:36.52	-37:06:13.76	1.62	B2IV	2	beta Cephei pulsating variable star	time resolved photometry in known passbands like Johnson, Geneva, Stromgren, Walraven; time resolution 15 minutes or better time resolved spectroscopy; time resolution better than 15 minutes	BRITE GBOT & A. Pigulski	konstanze.zwintz@uibk.ac.at; pigulski@astro.uni.wroc.pl
zeta Cen	13:55:32.386	-47:17:18.5	2.55	B2.5 IV	2	eclipsing binary: better determination of binary orbit parameters	time resolved spectroscopy time resolution better than 15 minutes	Gerald Handler	gerald@camk.edu.pl

BRITE-Constellation Ground Based Observations Team (GBOT) links:

http://www.univie.ac.at/brite-constellation/html/gbs-internal.html

http://www.univie.ac.at/brite-constellation/html/gbot-amateurs.html

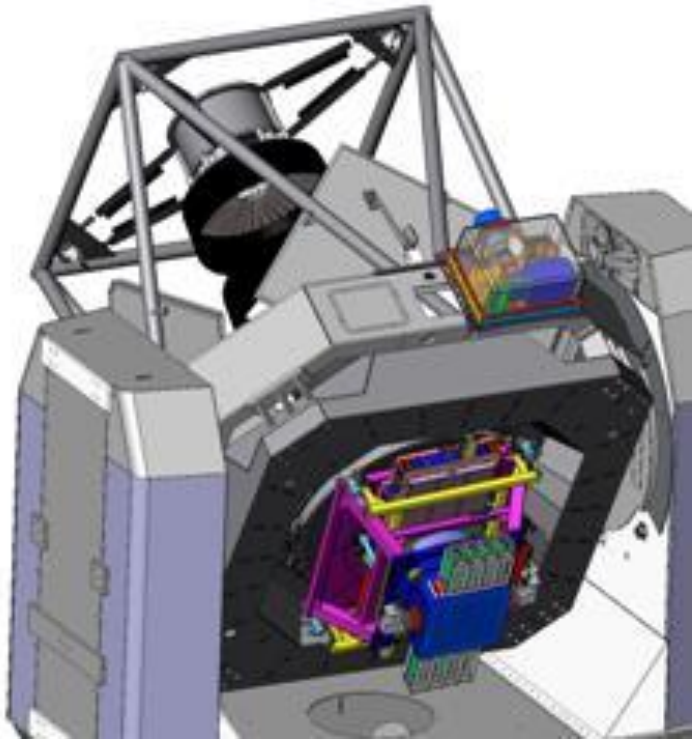
Pan-STARRS

Panoramic Survey Telescope & Rapid Response System
4 optische Systeme, 1.8 m Spiegel
3 Grad Gesichtsfeld,
1,4 giga pixels
6 000 deg^2 pro Nacht
Belichtungszeit: 30 -60 s (bis 24 mag)

The whole available **sky**
as seen from Hawaii
will be **observed 3 times**
during the dark time
in each lunar cycle.

http://ps1sc.org/

LURE observatory on Haleakala, Maui.
First light occurred in June 2006 and the telescope was formally dedicated on June 30, 2006.
The first of the Gigapixel cameras, GPC1, was installed in August 2007.



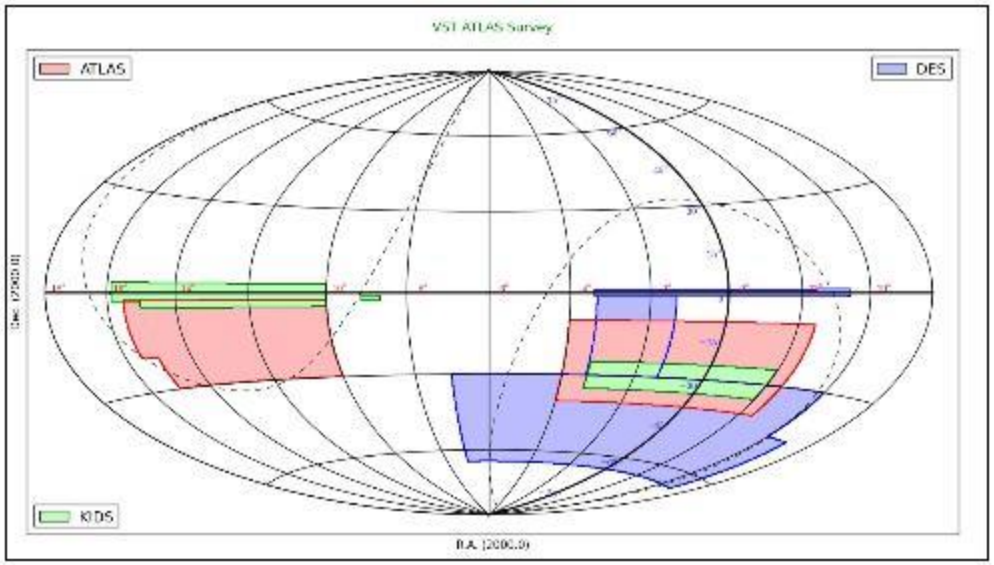
ATLAS

4500 deg2 of the Southern Sky at high galactic latitudes
The ATLAS will complement the proposed VISTA Hemisphere Survey in the South

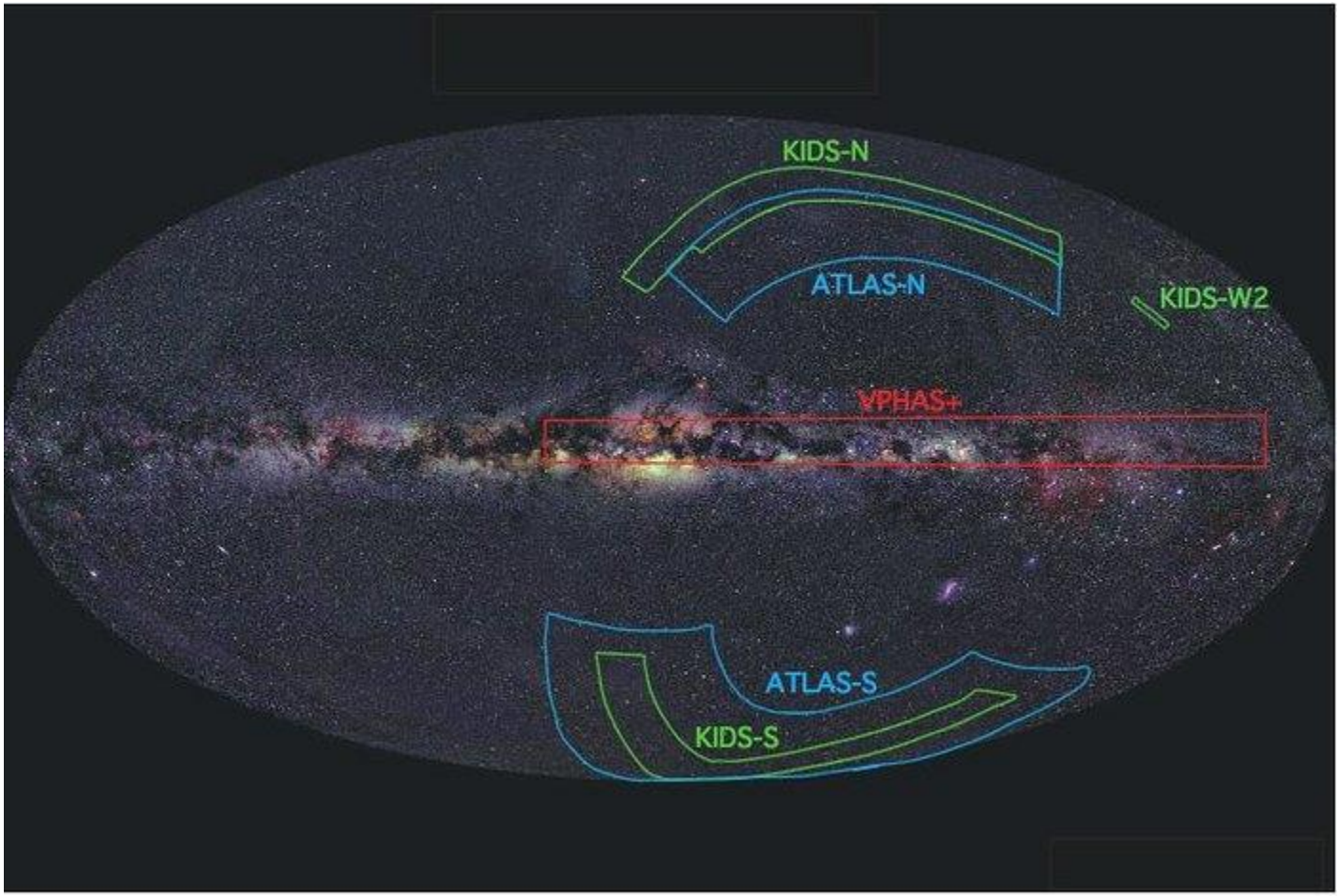
RA range	Dec range
21^h30 -> 04^h00	-40^o -> -10^o
10^h00 -> 15^h30	-20^o -> -2^o
10^h00 -> 15^h00	-29^o -> -20^o

Exposure times (secs)

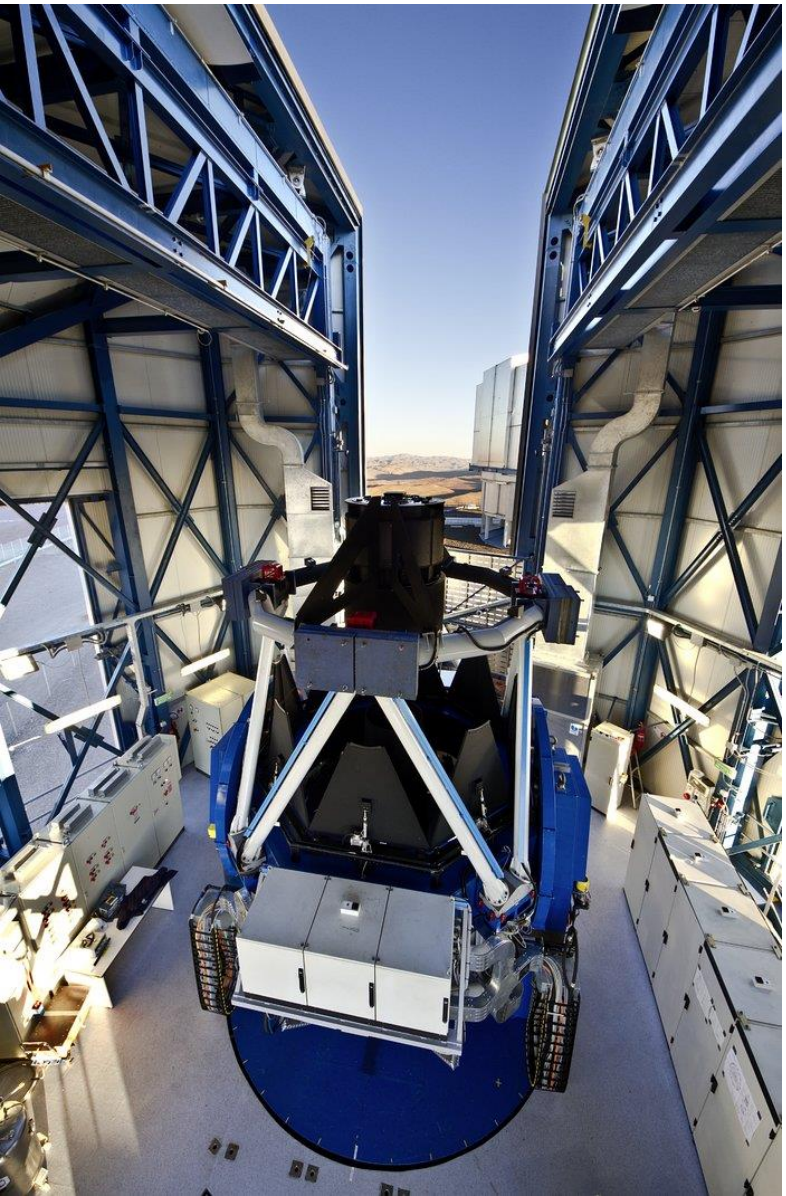
u	g	r	i	z
60x2	50x2	45x2	45x2	45x2



http://astro.dur.ac.uk/Cosmology/vstatlas/


KIDS-N
ATLAS-N
KIDS-W2
VPHAS+
ATLAS-S
KIDS-S

VISTA



Visible and Infrared Survey Telescope for Astronomy

The VST is a state-of-the-art 2.6-metre telescope,
with the huge 268-megapixel camera OmegaCAM

The VLT Survey Telescope:
the largest telescope in the world designed
for visible light sky surveys

Mirror: 2,65 m
Site: Cerro Paranal

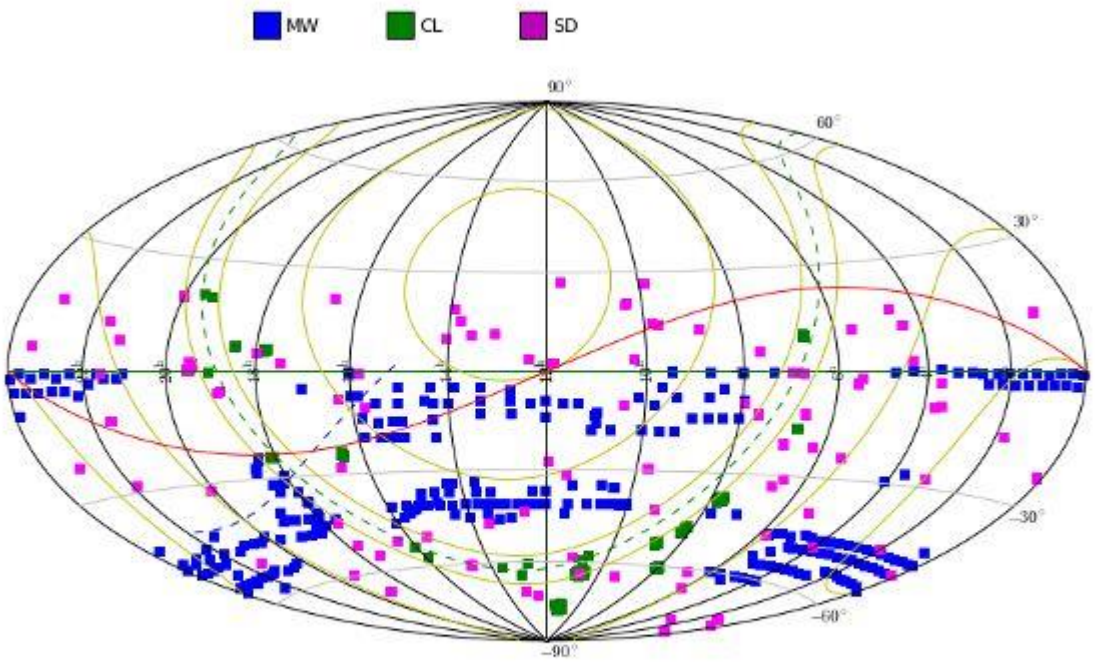
http://casu.ast.cam.ac.uk/surveys-projects/vista/

The Gaia-ESO Public Spectroscopic Survey

The Gaia-ESO Public Spectroscopic Survey has begun and will obtain high quality spectroscopy of some 100 000 Milky Way stars, in the field and in open clusters, down to magnitude 19, systematically covering all the major components of the Milky Way

First Light: Dec. 2011

https://www.gaia-eso.eu/



Map of observed targets on the sky (provided by Cambridge Astronomy Survey Unit (CASU), see Gaia-ESO Survey overview). Observations included in the fourth internal Survey data release (from the beginning of the Survey up until July 2014) are shown. **Key:** MW = Milky Way, CL = Cluster, SD = Standard.

Gaia

(Raumsonde)

Globales Astronomisches Interferometer für die Astrophysik

Insgesamt 106 CCD-Detektoren

Astrometrie
62 CCD-Detektoren

Photometrie
14 CCD-Detektoren in zwei Reihen
330 bis 680 nm
640 bis 1050 nm

Spektrophotometrie
Spektrale Auflösungsvermögen: 15 bis 60

Gaia

Typ:	Weltraumteleskop
Betreiber:	ESA

Missionsdaten

Masse:	2030 kg
Start:	19. Dezember 2013, 9:12 Uhr UTC
Startplatz:	Centre Spatial Guyanais, ELS
Trägerrakete:	Sojus-ST
Flugdauer:	5 Jahre (geplant)
Status:	im Orbit

Wikipedia

Was leisten Surveys
- künftig

PLATO:

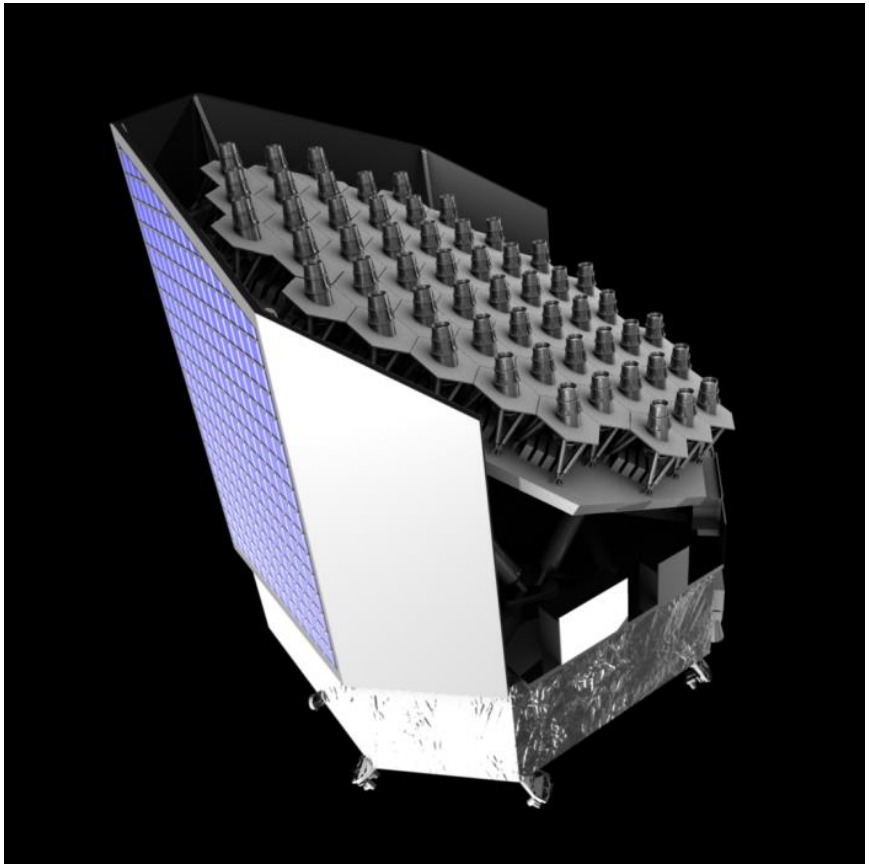
PLAnetary Transits and Oscillations of Stars

34 kleine selbständige Teleskope,
Fotometrie heller Sterne im Weltraum (L2).
120mm Linsen Optik (6 Linsen)
1100 deg^2

4510^2 Pixel (18 µm)

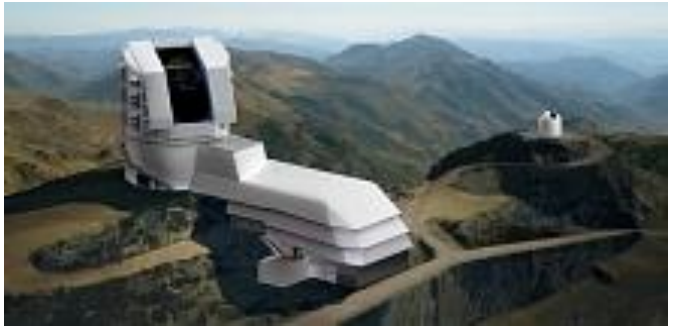
25 s read out: m_v = 8 - 16
2,5 s read out: m_v = 4 – 8

Start 2014



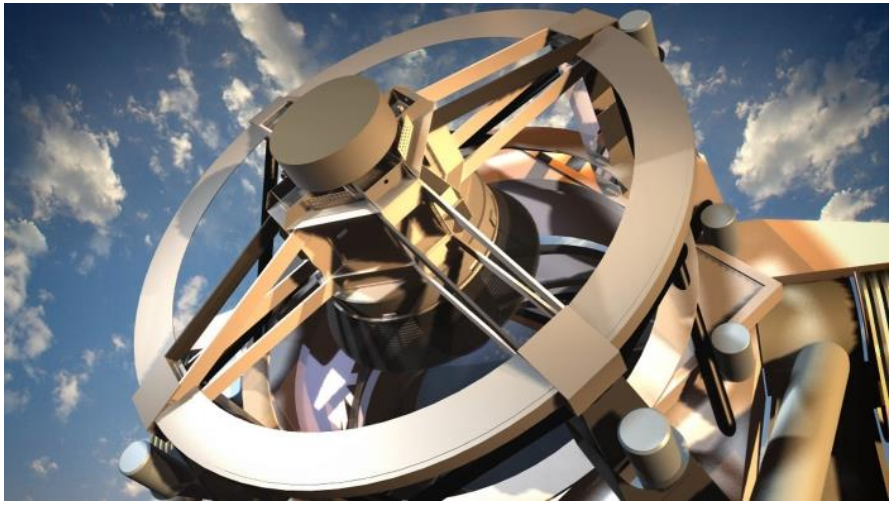
Prof. Heike Rauer
Deutsches Zentrum für Luft- und Raumfahrt (DLR)
DLR-Institut für Planetenforschung

Was leisten Surveys
- künftig



LSST

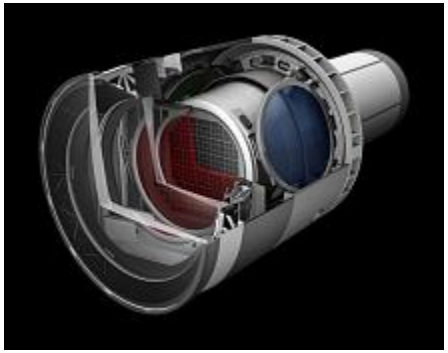
Large Synoptic Survey Telescope:



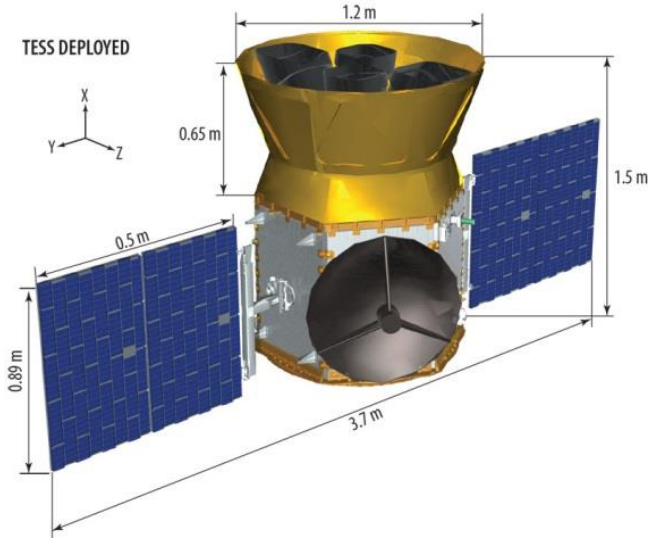
8,4 m Teleskop,
3,5° Bildfeld-Durchmesser
0,2“ Auflösung
3,2-Milliarden-Pixel-Kamera, 64 cm,
6000 TB pro Jahr

Fotometrie des gesamten erreichbaren Himmels in 3 Tagen.

Standort: Chile
First Light: 2019



Was leisten Surveys
- künftig



TESS

NASA: **T**ransiting **E**xoplanet **S**urvey **S**atellite (TESS)
24° x 24°, 100mm linsenobjektiv, Filter: 600 – 1000 nm

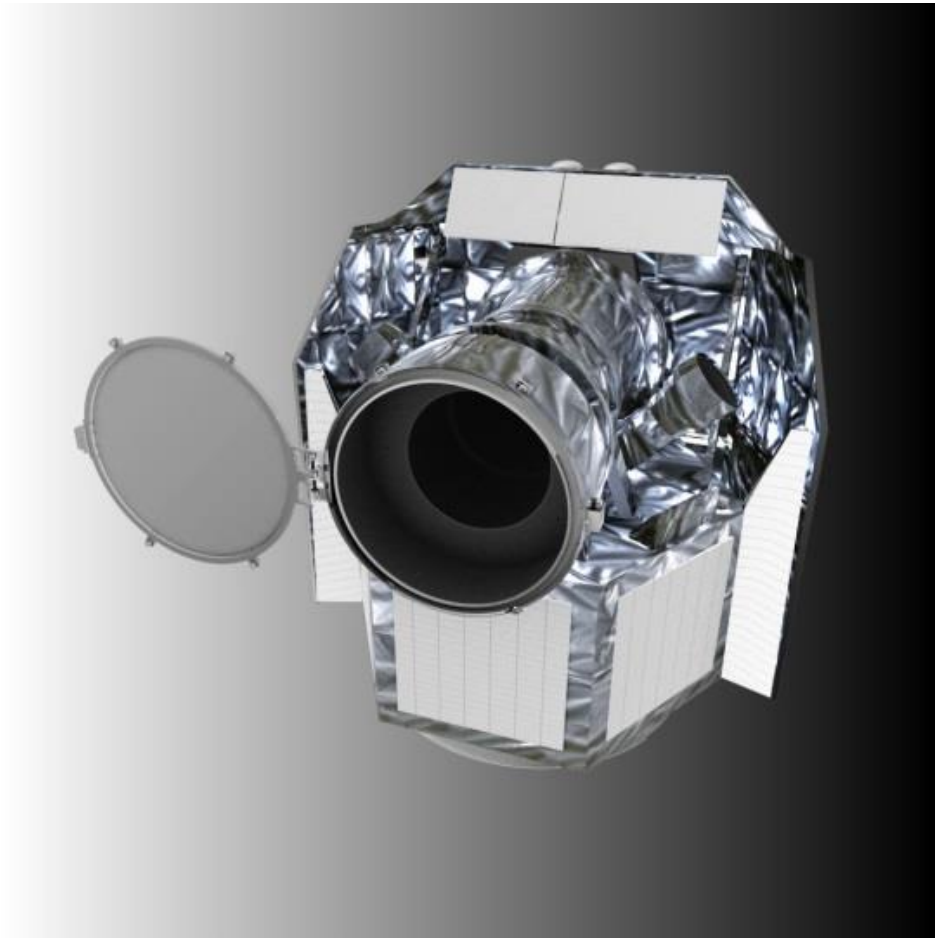
ALL-SKY,
TWO YEAR PHOTOMETRIC EXOPLANET DISCOVERY MISSION

CHEOPS

ESA: CHEOPS **CH**aracterising **E**x**OP**lanet **S**atellite
30 cm Objektiv

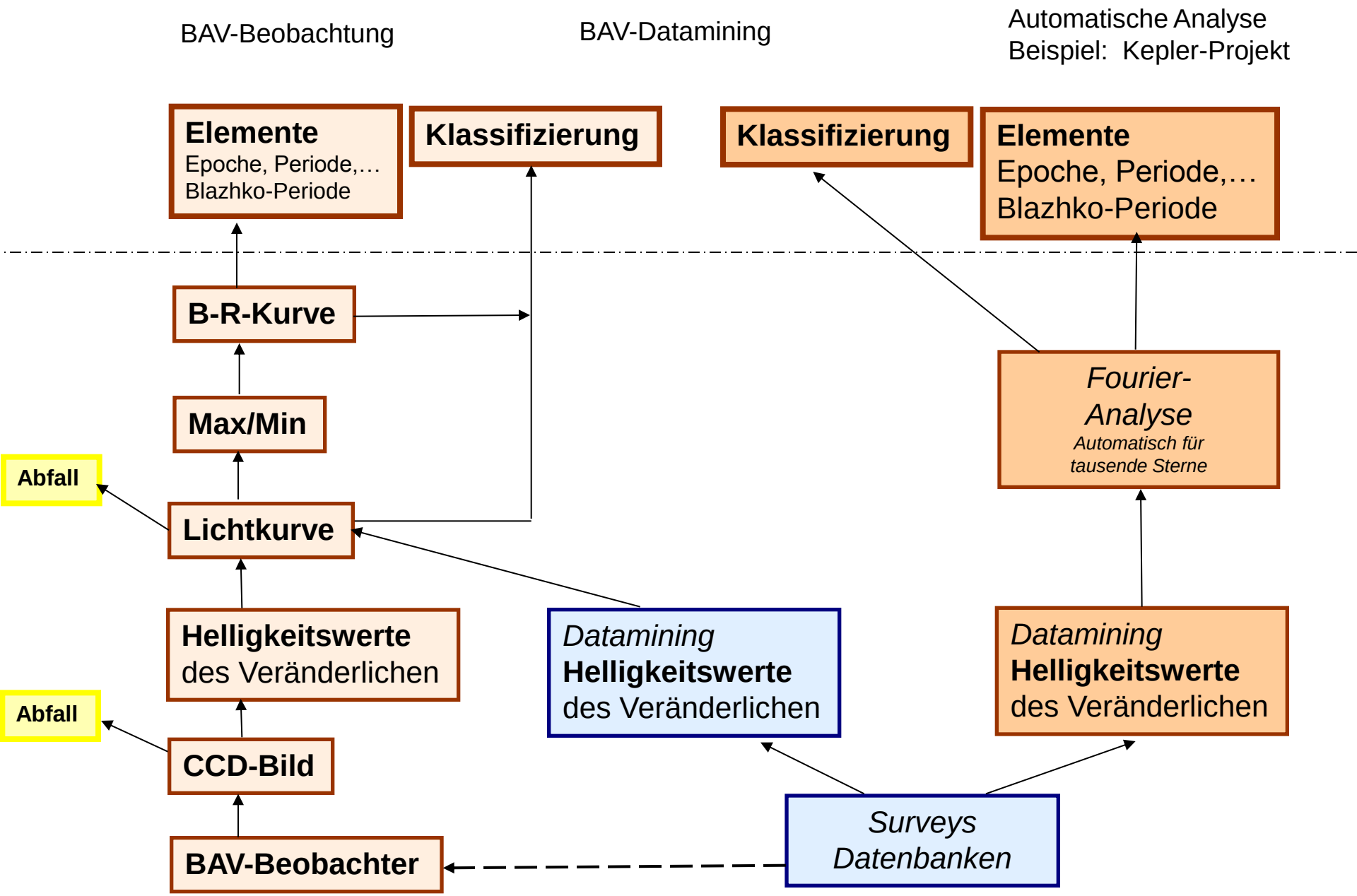
Start: Ende 2017
Masse 200 kg
Flugdauer: 3,5 Jahre

Hauptziel, Exoplaneten in der
näheren Umgebung der Erde
zu charakterisieren
und zu untersuchen.
Es wird dafür etwa 500 Sterne mit
bereits bekannten Planetensystemen
aus einer Erdumlaufbahn beobachten.



Datenauswertung

Datenauswertung BAV - Kepler



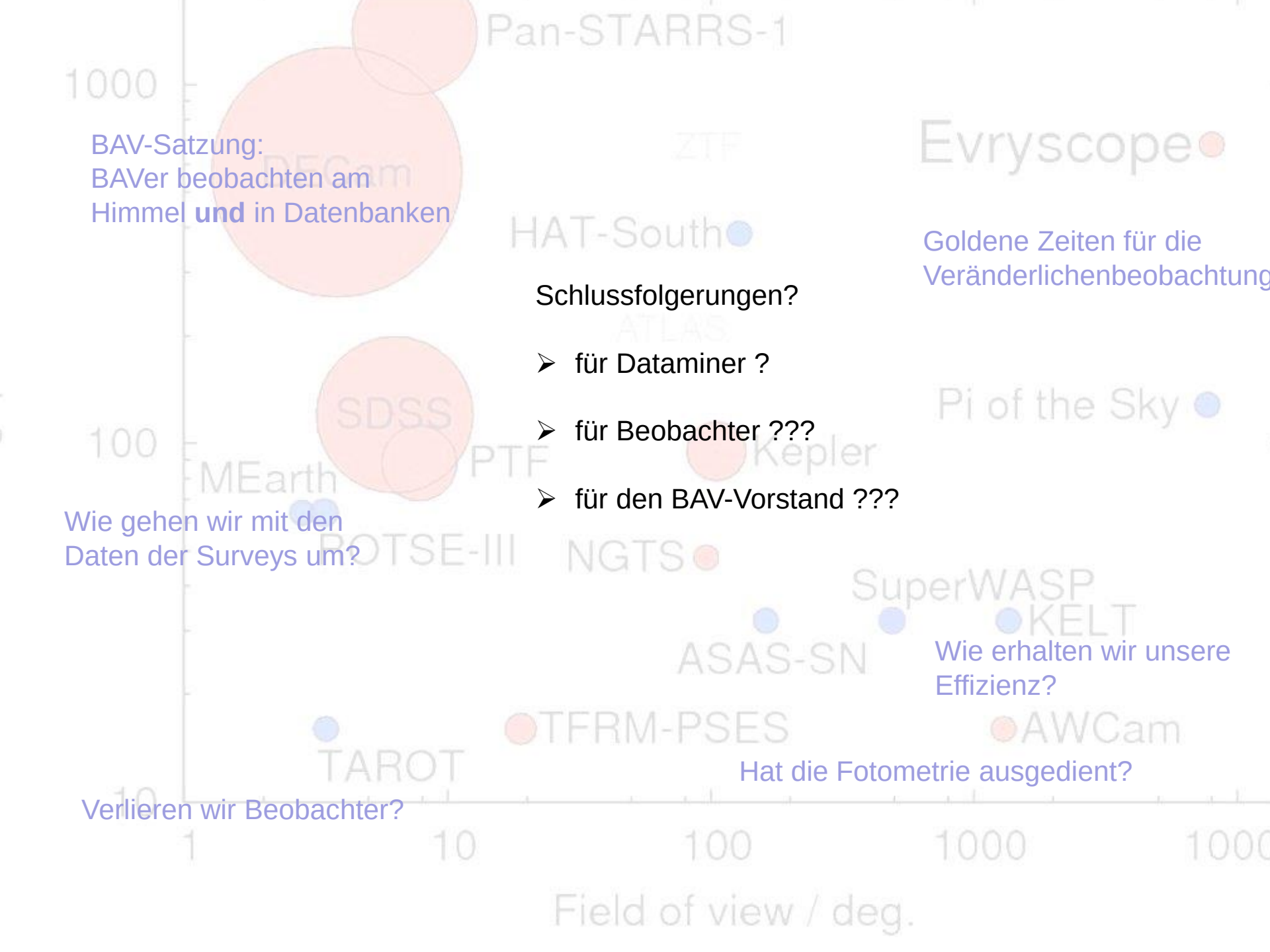
Automatische Auswertung Kepler-Daten

A&A 529, A89 (2011)
Global stellar variability study in the field-of-view of the Kepler satellite
J. Debosscher1, J. Blomme1, C. Aerts1,2, and J. De Ridder1

BR Cyg = kplr009899416 in Zeile 26 352 von 150 257

														f1	f2	f3		
kplr003946978	3.00	3.37	21.64	0.991064	0.008936	0.000000	MISC	BCEP	ECL	0.794190	0.812589	0.759806	3.98846339	20.02597013	6.77291873	0.00003450	0.0000
kplr012013259	2.62	2.68	3.43	0.968661	0.031339	0.000001	BCEP	MISC	GDOR	0.777894	0.715685	0.795160	5.58091352	8.41319726	13.74314894	0.00008615	0.0000
kplr010665561	1.24	1.58	2.18	0.989981	0.009938	0.000080	ACT	MISC	ROT	0.000000	0.000000	0.000000	0.08962899	0.14639401	0.11651768	0.00266536	0.0007
kplr007530203	2.10	2.71	54.58	0.999975	0.000025	0.000000	ACT	MISC	ECL	0.000000	0.000000	0.059636	0.03883901	0.26291025	0.22705885	0.00024358	0.0000
kplr010460561	2.89	3.08	24.09	0.718457	0.281543	0.000000	MISC	BCEP	ECL	0.766111	0.768824	0.827674	7.11656316	14.65438384	8.66714934	0.00005041	0.0000
kplr006676219	3.28	3.29	70.45	0.920768	0.079232	0.000000	BCEP	MISC	ECL	0.793707	0.717846	0.813513	11.66669043	3.87196691	1.39522265	0.00002602	0.0000
kplr010224274	2.99	3.24	33.16	0.909343	0.090657	0.000000	MISC	BCEP	ECL	0.737150	0.761379	0.758507	7.29576283	0.30473702	0.20614563	0.00006233	0.0000
kplr005708923	2.18	2.39	35.78	0.990663	0.009337	0.000000	ACT	MISC	ECL	0.000000	0.084479	0.055326	0.05676457	0.08365305	0.14340523	0.00093983	0.0002
kplr004059125	2.69	2.88	3.58	0.688052	0.311948	0.000001	MISC	BCEP	GDOR	0.782538	0.755575	0.827097	9.52448797	6.17239402	2.86511417	0.00007741	0.0000
kplr006966132	1.46	1.66	25.66	0.980367	0.019633	0.000000	ROT	MISC	ECL	0.000000	0.000000	0.000000	0.10755378	0.23602079	0.13145462	0.00468003	0.0034
kplr007282914	2.63	2.81	34.56	0.995196	0.004804	0.000000	BCEP	MISC	ECL	0.771593	0.794100	0.690684	4.43661102	2.45283343	10.63890360	0.00006832	0.0000
kplr010472670	2.65	3.50	40.18	0.999999	0.000001	0.000000	MISC	ACT	ECL	0.771182	0.820987	0.819792	0.31370110	14.98296197	7.01794171	0.00010622	0.0000
kplr002997753	2.63	3.48	47.22	0.999997	0.000003	0.000000	MISC	GDOR	ECL	0.802068	0.804664	0.850814	20.32464338	24.06213109	8.07548303	0.00008034	0.0000
kplr011563957	1.47	2.05	13.07	0.999678	0.000322	0.000000	ROT	MISC	ECL	0.000000	0.000000	0.000000	0.14041873	0.11651767	0.15834452	0.00401149	0.0025
kplr006634689	2.39	11.00	203.88	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.817163	0.809831	0.822503	23.29430562	12.88551239	0.94408113	0.00011006	0.0000
kplr012267023	2.67	43.24	971.44	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.791416	0.736631	0.768252	24.19086935	4.77125088	5.21043302	0.00008142	0.0000
kplr010223911	0.35	3.15	3.60	0.970932	0.029050	0.000018	ECL	MISC	ACT	0.013102	0.360594	0.379853	0.40631606	0.20315803	0.37643988	0.00006355	0.0000
kplr011178117	2.80	37.46	2917.34	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.762887	0.735030	0.813849	0.56466641	21.17050908	8.78967509	0.00006632	0.0000
kplr005112157	2.56	2.95	19.35	0.999727	0.000273	0.000000	ACT	MISC	ECL	0.631761	0.571803	0.642248	0.31668572	0.39436335	0.14938006	0.00012368	0.0000
kplr008350997	3.20	3.56	16.49	0.993424	0.006576	0.000000	MISC	BCEP	ECL	0.804599	0.796089	0.760060	17.77047487	1.57149795	14.59162732	0.00002926	0.0000
kplr005553642	3.04	14.69	2661.06	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.770547	0.767711	0.724018	24.42660421	0.50191652	23.44667195	0.00004835	0.0000
kplr009899416	0.23	1.03	1.40	0.999967	0.000033	0.000001	ECL	RUTAU	MISC	0.000000	0.000000	0.000000	1.49978598	0.74989299	3.75245257	0.21831454	0.1346
kplr011707080	2.86	53.40	1187.27	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.568862	0.606475	0.722170	1.20700885	4.42769087	2.77253517	0.00005685	0.0000
kplr008364418	3.25	3.72	35.88	0.999422	0.000578	0.000000	MISC	BCEP	ECL	0.834942	0.834998	0.810466	14.58856240	24.44174272	23.91293348	0.00002218	0.0000
kplr010022925	3.09	3.16	23.51	0.978798	0.021202	0.000000	BCEP	MISC	ECL	0.776558	0.696505	0.752590	7				00
kplr010287711	2.78	17.23	2800.38	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.793513	0.788840	0.829752	0				00
kplr003743725	2.27	2.91	17.51	0.999725	0.000275	0.000000	MISC	ACT	ECL	0.151043	0.104234	0.134881	0				00
kplr005780169	2.94	3.19	63.72	0.892542	0.107458	0.000000	MISC	BCEP	ECL	0.741540	0.762328	0.785862	3				00
kplr008193511	2.14	2.63	17.61	0.999862	0.000138	0.000000	ACT	MISC	ECL	0.000000	0.000000	0.000000	0				03
kplr010162836	2.00	54.35	1120.14	1.000000	0.000000	0.000000	ROT	ECL	RRD	0.000000	0.000000	0.000000	0				04
kplr005598975	2.67	3.36	35.09	0.999958	0.000042	0.000000	MISC	BCEP	ECL	0.755839	0.782892	0.704203	16				00
kplr010492468	2.26	2.41	17.02	0.980232	0.019768	0.000000	ACT	MISC	ECL	0.000152	0.034024	0.129695	0				00
kplr010153660	2.72	2.87	16.54	0.507188	0.492812	0.000000	MISC	BCEP	ECL	0.837935	0.842937	0.843340	3				00
kplr011463468	3.12	3.45	18.46	0.990748	0.009252	0.000000	MISC	ACT	ECL	0.723079	0.594216	0.806729	0				00
kplr003558468	2.84	29.13	240.43	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.582061	0.600173	0.555727	1				00
kplr010292758	2.66	3.08	3.47	0.991647	0.008348	0.000005	MISC	BCEP	GDOR	0.760272	0.814025	0.821496	11				00
kplr006142199	3.39	4.03	29.52	0.999992	0.000008	0.000000	MISC	BCEP	ECL	0.753884	0.855338	0.846501	20				00
kplr011650966	2.55	2.77	3.24	0.736045	0.263880	0.000075	MISC	BCEP	GDOR	0.769784	0.832393	0.839763	3				00
kplr005456099	3.20	3.24	3.98	0.842610	0.157389	0.000001	MISC	ECL	BCEP	0.767201	0.806241	0.795260	23				00
kplr008411859	3.17	3.17	21.17	0.863845	0.136155	0.000000	ACT	MISC	ECL	0.000001	0.022695	0.079078	0				00
kplr009823166	2.95	3.11	35.17	0.644624	0.355376	0.000000	MISC	BCEP	ECL	0.757795	0.815466	0.805227	3				00
kplr009778558	2.98	3.54	7.13	0.999770	0.000230	0.000000	MISC	BCEP	ECL	0.827845	0.819410	0.850772	16				00
kplr003346415	1.31	2.10	2.43	0.999938	0.000044	0.000018	ROT	MISC	ELL	0.000000	0.000000	0.000000	0				05
kplr010154538	2.62	25.60	2367.79	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.822015	0.821730	0.833878	0				00
kplr011618522	2.71	3.12	49.77	0.995934	0.004066	0.000000	MISC	ACT	ECL	0.345870	0.145727	0.351307	1				00
kplr011653237	2.60	3.52	3.47	0.999998	0.000001	0.000001	MISC	GDOR	BCEP	0.848908	0.833816	0.831921	20				00
kplr001576789	3.11	3.31	16.95	0.998185	0.001815	0.000000	BCEP	MISC	ECL	0.773477	0.793349	0.808180	4				00
kplr010879314	2.07	57.07	867.51	1.000000	0.000000	0.000000	ROT	ECL	RRD	0.000000	0.000000	0.000000	0				08
kplr005457374	1.46	1.84	23.31	0.996647	0.003353	0.000000	ROT	MISC	ECL	0.000000	0.000000	0.000000	0				17
kplr009832926	3.31	9.01	464.41	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.811316	0.801201	0.771910	0				00
kplr008605019	3.17	3.13	25.45	0.848970	0.151030	0.000000	BCEP	MISC	ECL	0.733334	0.801506	0.787958	4				00
kplr006346274	2.97	25.19	1864.10	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.788619	0.788922	0.792179	0				00
kplr009368621	1.41	1.28	1.65	0.680476	0.258885	0.060639	ROT	MISC	ACT	0.000000	0.000000	0.000000	0				14
kplr005473556	1.00	1.85	4.50	0.994859	0.005141	0.000000	MISC	ROT	ECL	0.000062	0.000005	0.000069	0				16
kplr002421920	2.31	3.09	48.99	0.999978	0.000022	0.000000	MISC	ACT	ECL	0.011192	0.062928	0.096443	0				01
kplr009119782	2.92	36.52	141.82	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.818536	0.843674	0.828908	20				00
kplr009152097	2.68	3.30	14.30	0.999903	0.000097	0.000000	MISC	ACT	ECL	0.635155	0.730076	0.746225	0				00
kplr007744199	2.95	3.65	20.53	0.999989	0.000011	0.000000	MISC	BCEP	ECL	0.770957	0.845151	0.750260	22				00
kplr010909661	2.56	17.27	292.27	1.000000	0.000000	0.000000	MISC	ECL	RRD	0.756374	0.739432	0.770713	21				00

Bytes	Format	Units	Label	Explanations
1- 4	A4	---	---	[kplr]
5- 13	I9	---	KIC	KIC (Kepler Input Catalogue) Identifier
15- 21	F7.2	---	Mdist1	Mahalanobis distance to class 1 (1)
23- 29	F7.2	---	Mdist2	Mahalanobis distance to class 2 (1)
31- 37	F7.2	---	Mdist3	Mahalanobis distance to class 3 (1)
39- 46	F8.6	---	pV1	Class probability 1 (2)
48- 55	F8.6	---	pV2	Class probability 2 (2)
57- 64	F8.6	---	pV3	Class probability 3 (2)
66- 71	A6	---	V1	Class code 1 (3)
73- 78	A6	---	V2	Class code 2 (3)
80- 85	A6	---	V3	Class code 3 (3)
87- 94	F8.6	---	Pf1	[0/1] Significance parameter f1 (4)
96-103	F8.6	---	Pf2	[0/1] Significance parameter f2 (4)
105-112	F8.6	---	Pf3	[0/1] Significance parameter f3 (4)
114-126	F13.8	1/d	f1	First (dominant) detected frequency
128-140	F13.8	1/d	f2	Second detected frequency
142-154	F13.8	1/d	f3	Third detected frequency
156-168	F13.8	mag	amp11	Amplitude of f1
170-182	F13.8	mag	amp12	Amplitude of 2*f1
184-196	F13.8	mag	amp13	Amplitude of 3*f1
198-210	F13.8	mag	amp14	Amplitude of 4*f1
212-224	F13.8	mag	amp21	Amplitude of f2
226-238	F13.8	mag	amp22	Amplitude of 2*f2
240-252	F13.8	mag	amp23	Amplitude of 3*f2
254-266	F13.8	mag	amp24	Amplitude of 4*f2
268-280	F13.8	mag	amp31	Amplitude of f3
282-294	F13.8	mag	amp32	Amplitude of 2*f3
296-308	F13.8	mag	amp33	Amplitude of 3*f3
310-322	F13.8	mag	amp34	Amplitude of 4*f3
324-336	F13.8	rad	phd12	Phase of 2*f1, if phase of f1=0 (5)
338-350	F13.8	rad	phd13	Phase of 3*f1, if phase of f1=0 (5)
352-364	F13.8	rad	phd14	Phase of 4*f1, if phase of f1=0 (5)
366-378	F13.8	rad	phd21	Phase of f2, if phase of f1=0 (5)
380-392	F13.8	rad	phd22	Phase of 2*f2, if phase of f1=0 (5)
394-406	F13.8	rad	phd23	Phase of 3*f2, if phase of f1=0 (5)
408-420	F13.8	rad	phd24	Phase of 4*f2, if phase of f1=0 (5)
422-434	F13.8	rad	phd31	Phase of f3, if phase of f1=0 (5)
436-448	F13.8	rad	phd32	Phase of 2*f3, if phase of f1=0 (5)
450-462	F13.8	rad	phd33	phase of 3*f3, if phase of f1=0 (5)
464-476	F13.8	rad	phd34	phase of 4*f3, if phase of f1=0 (5)
478-485	F8.6	---	varred	[0/1] Total variance reduction (6)
487	I1	---	ecl	[0,1] Eclipse detection flag (7)



BAV-Satzung:
BAVer beobachten am Himmel **und** in Datenbanken

Goldene Zeiten für die Veränderlichenbeobachtung

Schlussfolgerungen?

- für Dataminer ?
- für Beobachter ???
- für den BAV-Vorstand ???

Wie gehen wir mit den Daten der Surveys um?

Wie erhalten wir unsere Effizienz?

Hat die Fotometrie ausgedient?

Verlieren wir Beobachter?

Was leisten wir künftig?

Kriterien:
- Beitrag für die Wissenschaft
- Bezahlbar

Trends:
- Datamining in den Surveys → *Neuer Aufwand:* ***Datenbeschaffung***
- „Nischen“-Fotometrie → *Neuer Aufwand*: ***Nischen finden***

Was können wir - und Surveys nicht?

A Lücken füllen
- Kontinuität über Jahrzehnte
- Beobachtung der Polregion.
- Helligkeitslücken füllen
- Zeitliche Lücken füllen
- Vorteile großer Optiken nutzen, speziell langer Brennweiten
  - Umgebung heller Sterne in sternarmen Regionen

Wir brauchen neue Beobachtungsprogramme
Programme für „Nischen-Sterne“

B Spektroskopie Veränderlicher
- Spezielle Filter.
- Spektroskopie.
- …

Brauchen wir neue Ausrüstungen?

Um Sinnvolles zu tun,

sollten wir neue Beobachtungsfelder

erschließen und erkunden.

Vielen Dank für ihre Aufmerksamkeit