

Planet Activities at USM/MPE and Wendelstein

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AND

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Paul Steele, Arno Riffeser
Michele Cappette, Jesus Zendejas
Marco Montalto**

Planet Projects:

the past: OmegaTrans, TTV

the present: RoPACS, Pan-Planets

**the future: 2m Fraunhofer Telescope
 on Wendelstein**

Pre-OmegaTranS (2006-2010):

1 field in Carina
0.3 sq. deg. ($b \sim -4.5$)

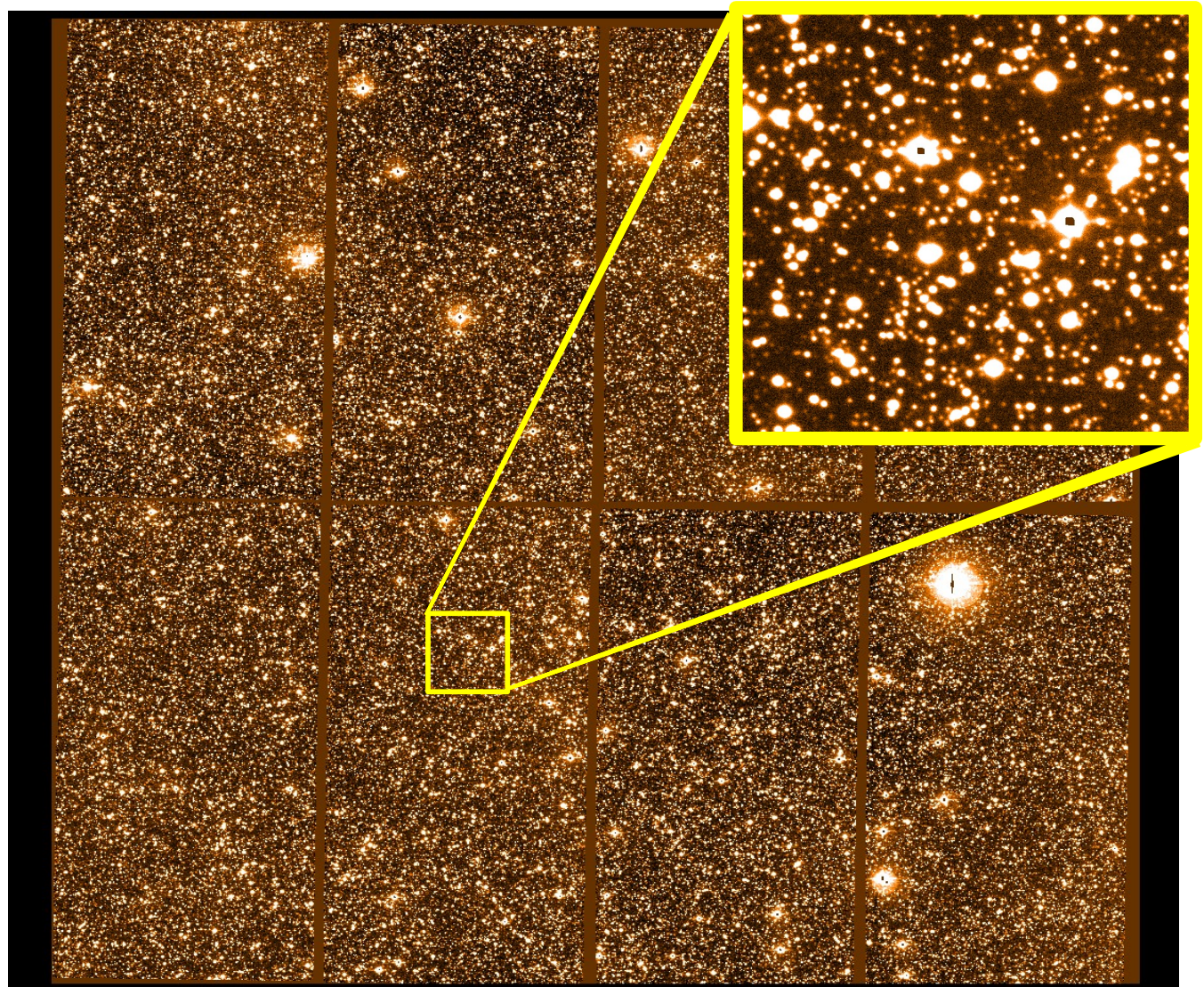
~25000 stars
~8000 dwarfs
($R \leq 17.5$)

110h observations
in 2006/2007/2008

~4000 images

1.5' cycle rate

~0.8 Tbyte raw data



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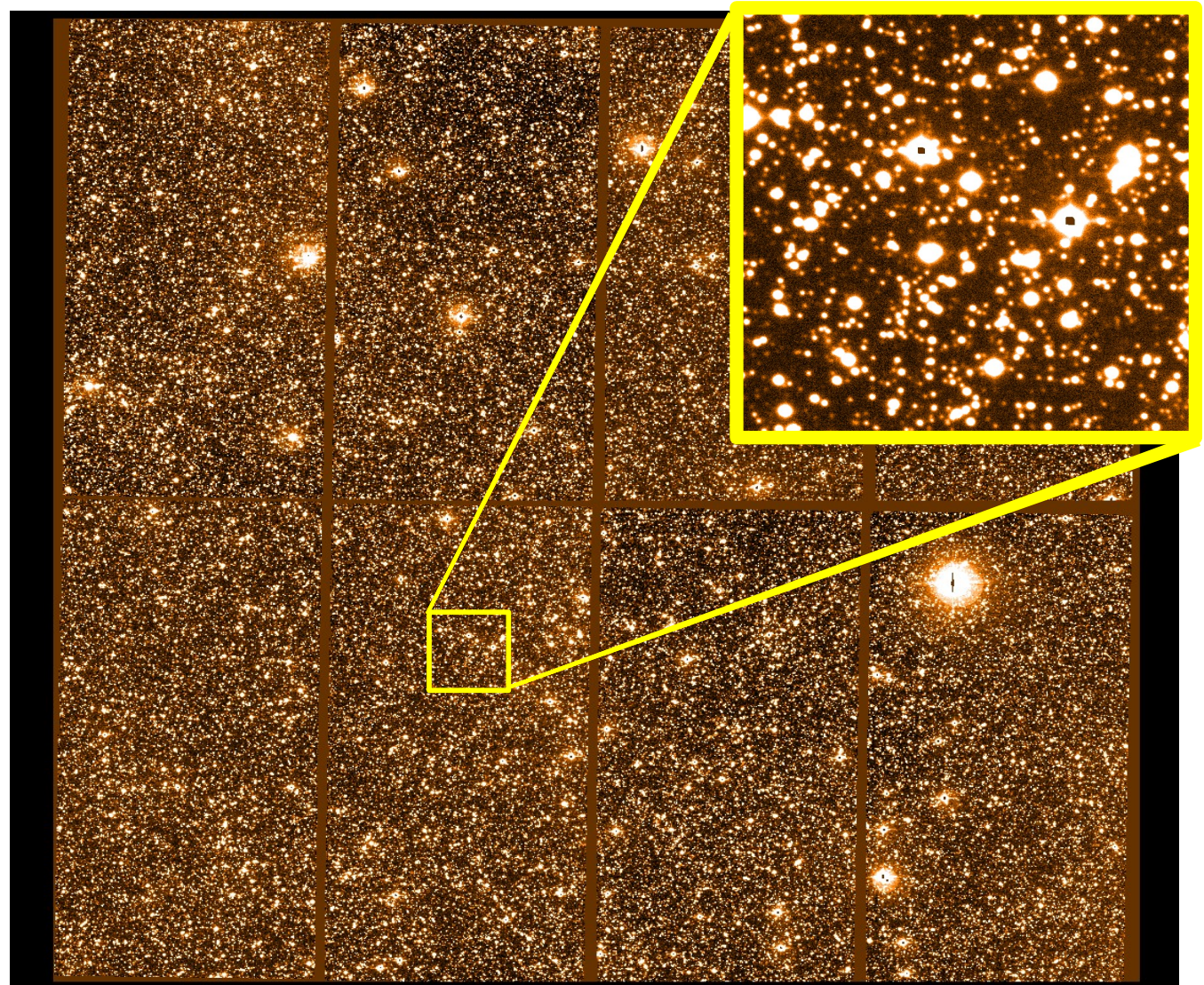
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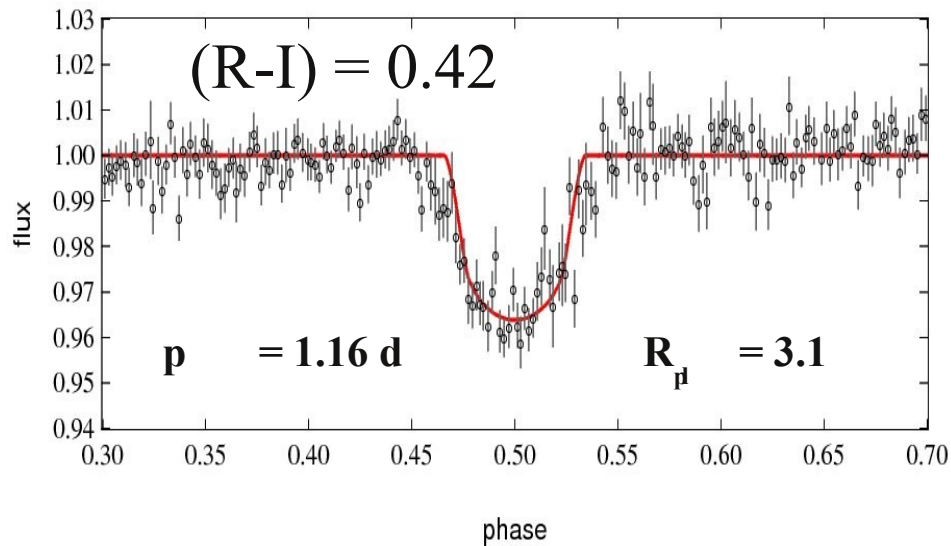
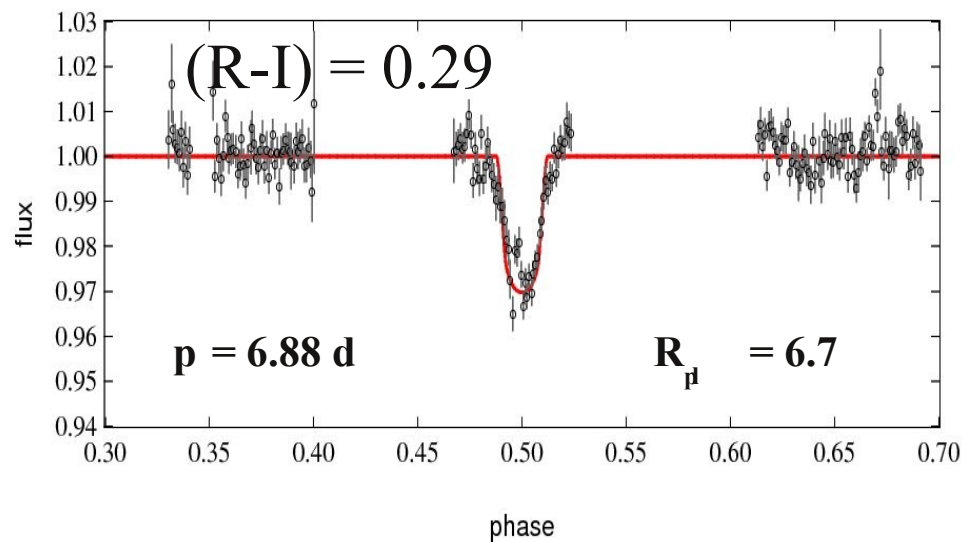
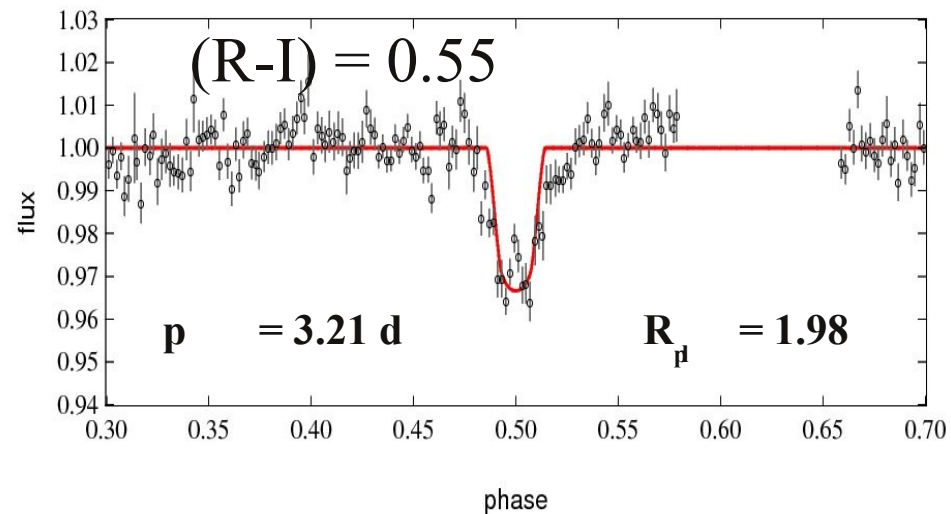
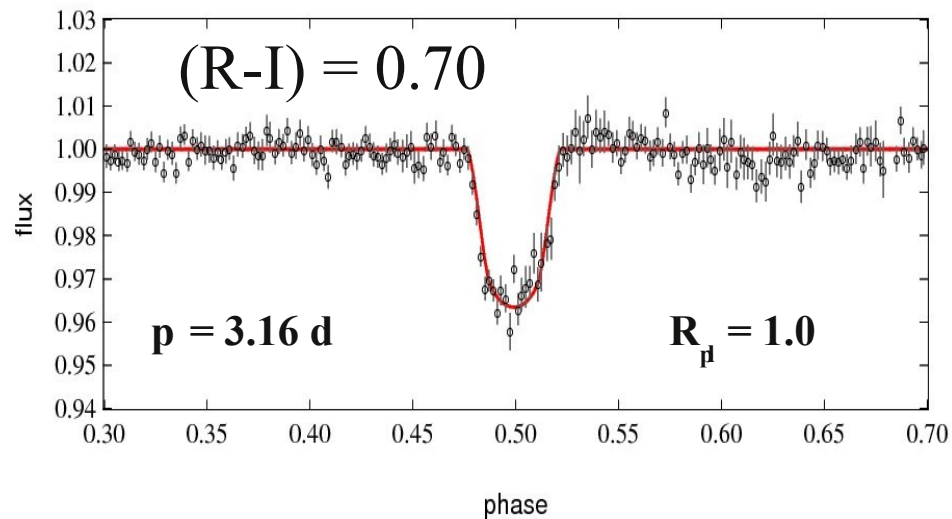
~4000 images

1.5' cycle rate

~0.8 Tbyte raw data



4 transit candidates:



Photometric follow-up with GROND:

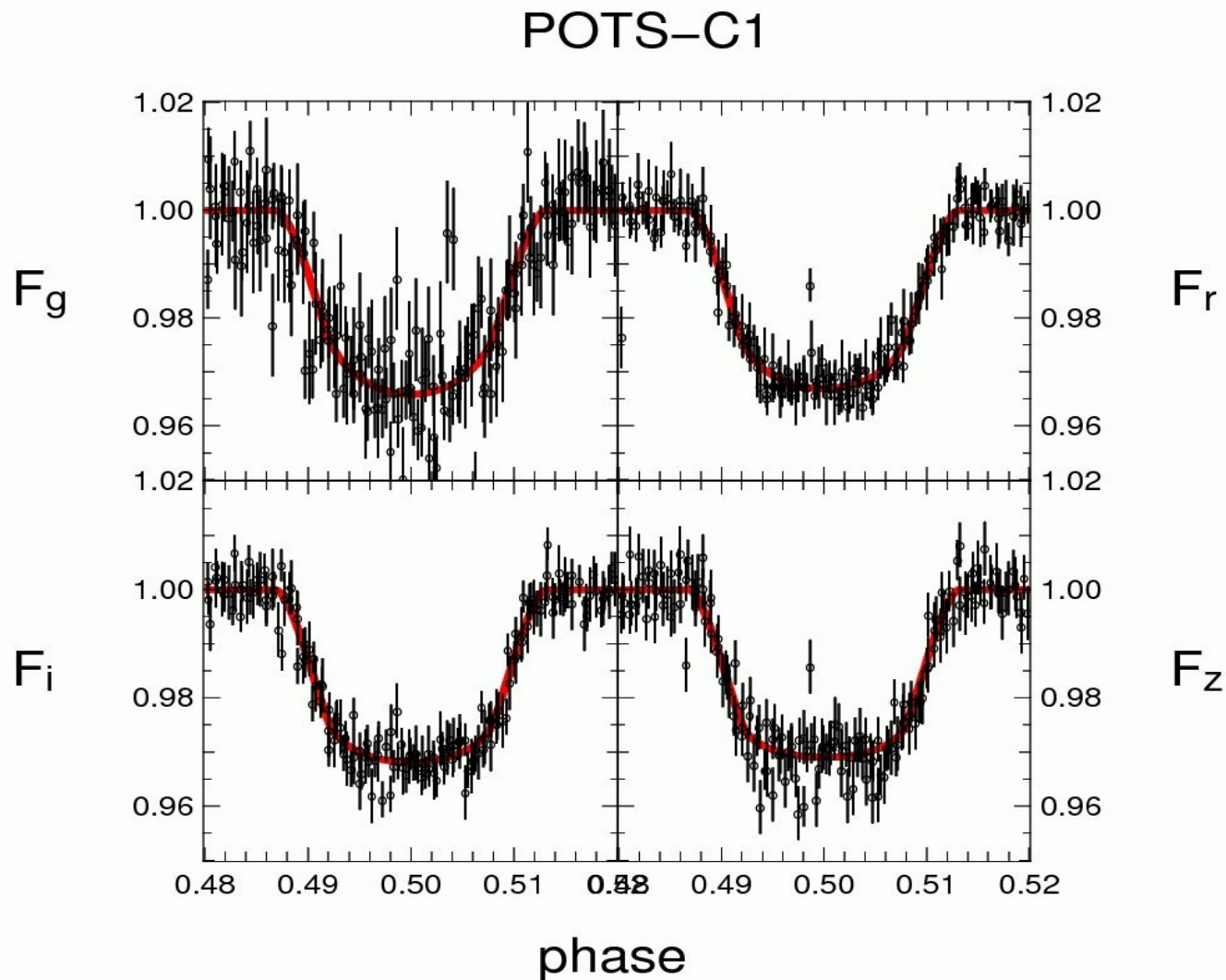
late K-dwarf

$p = 3.16$ days

$I = 16.0$ mag

$\Delta F/F = 0.03$

$R_{pl} = 1.05 R_{Jp}$



RV follow-up with UVES:

K8-dwarf

$p = 3.16$ days

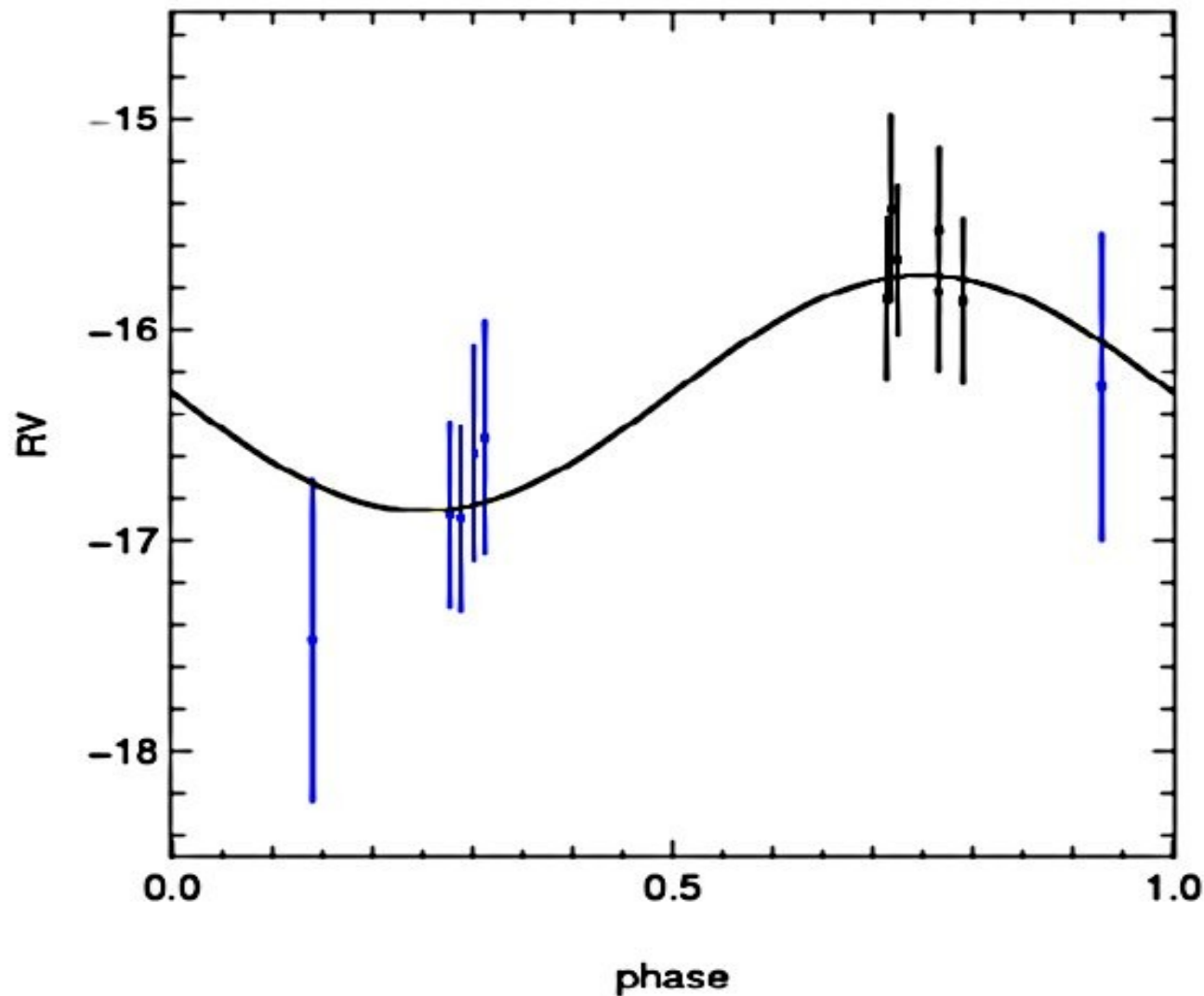
$I = 16.0$ mag

$\Delta F/F = 0.03$

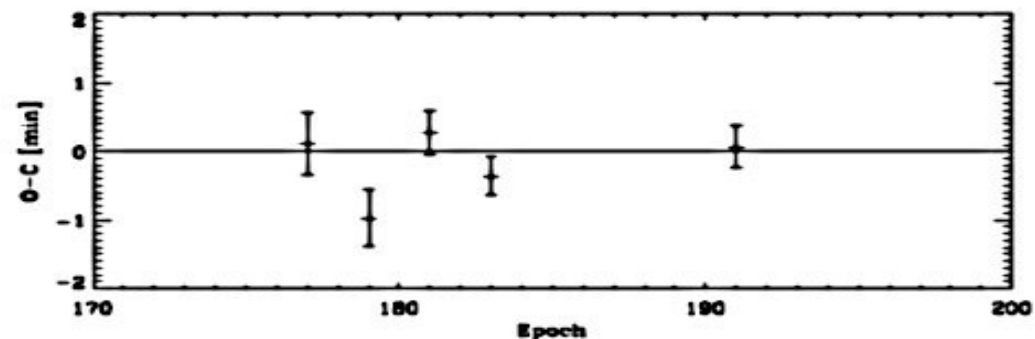
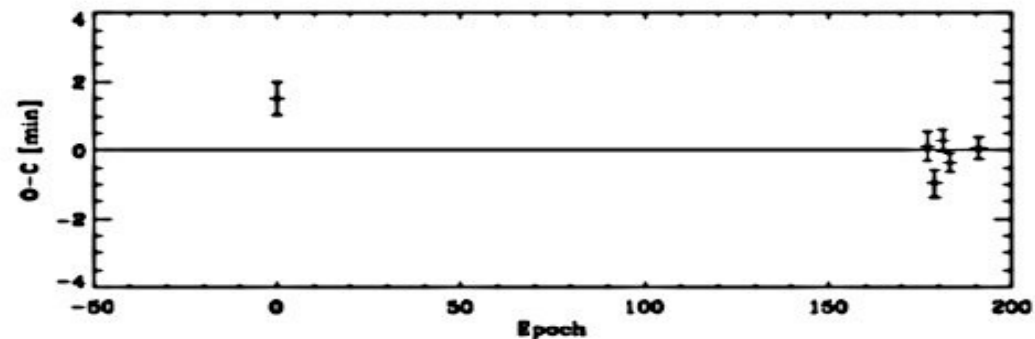
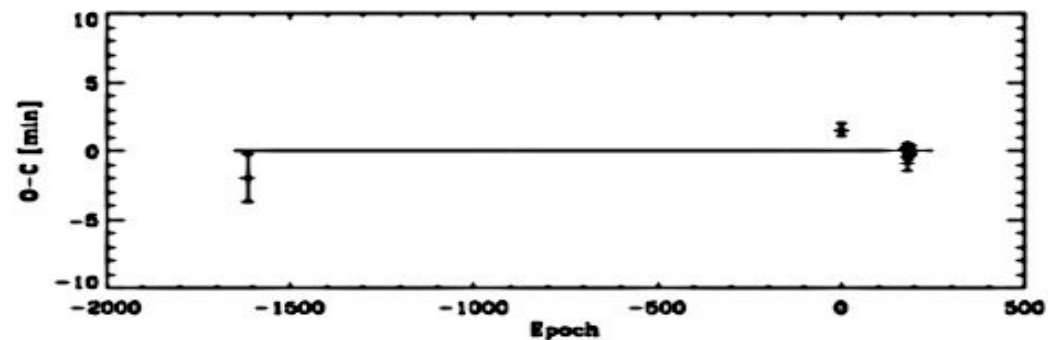
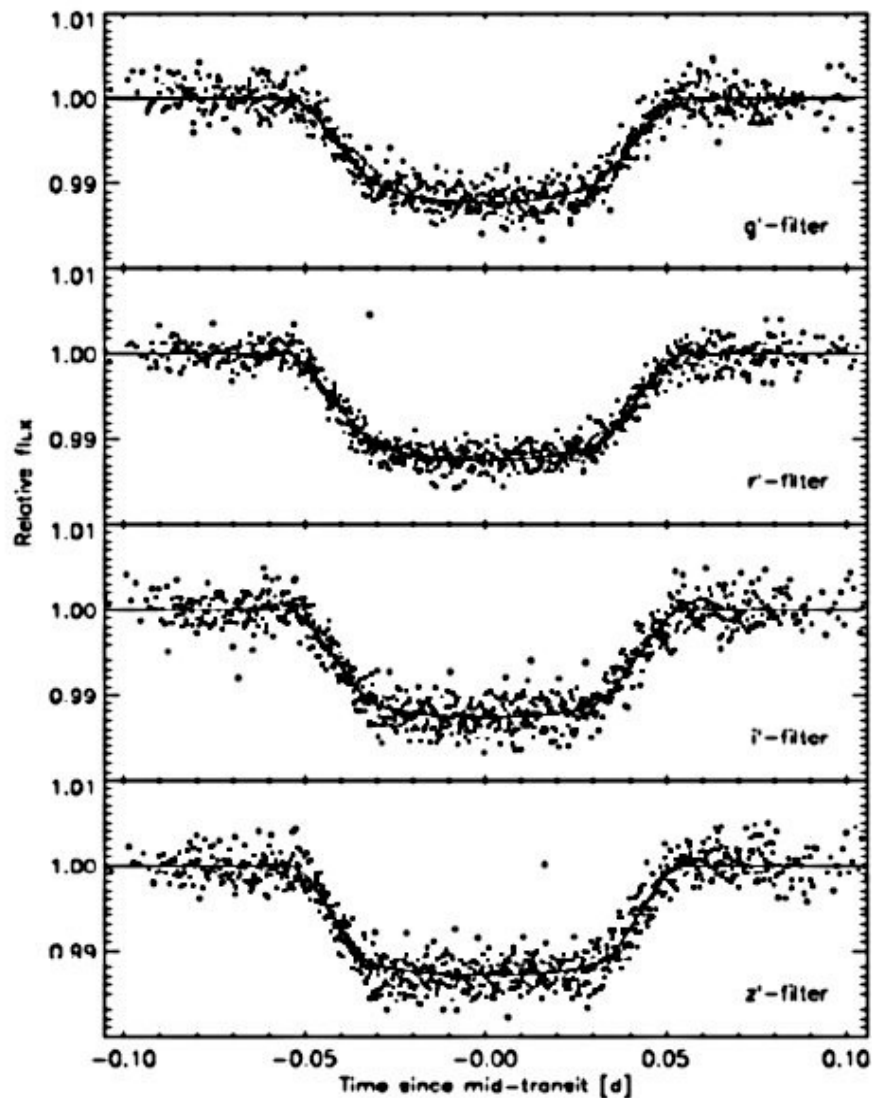
$R_{pl} = 1.05 R_{Jp}$

$\Delta RV = 560$ m/s

$M_{pl} = 2.9 M_{Jp}$



TTV of OGLE2-TR-L9 (2009+):



The RoPACS Survey (2008-2012):

D. Pinfield, S. Hodgkin, R. Saglia, E. Martin, D. Barrado, Y. Pavlenko and I. Snellen

- WTS: WFCAM Transit Survey (J-band)
- 240 hours with WFCAM at 4m UKIRT
- ~900 data points of one large field (1.8 sq. deg)
- data reduction and candidate selection ongoing
- Marie Curie ITN proposal successful (3 Postdoc, 11 PhD students)
=> 1 Postdoc + 2 PhD student for USM/MPE



“George”:

F5-dwarf

$p = 3.35$ days

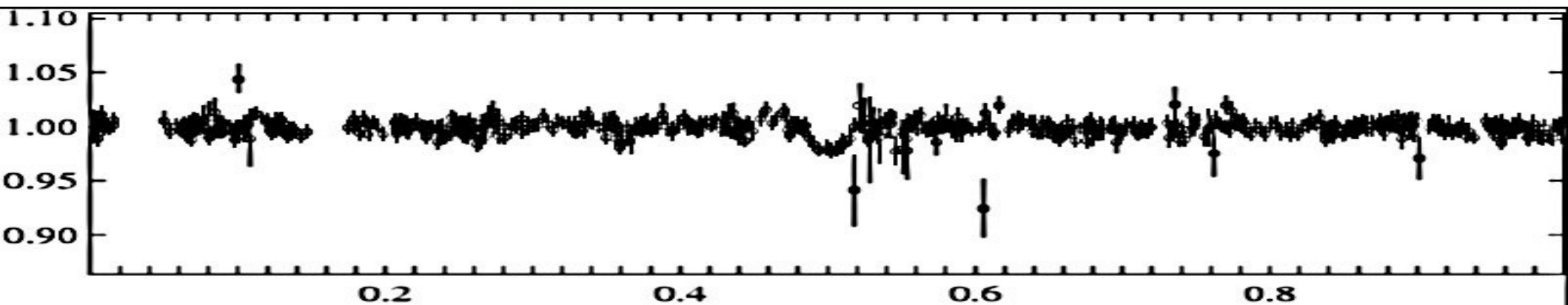
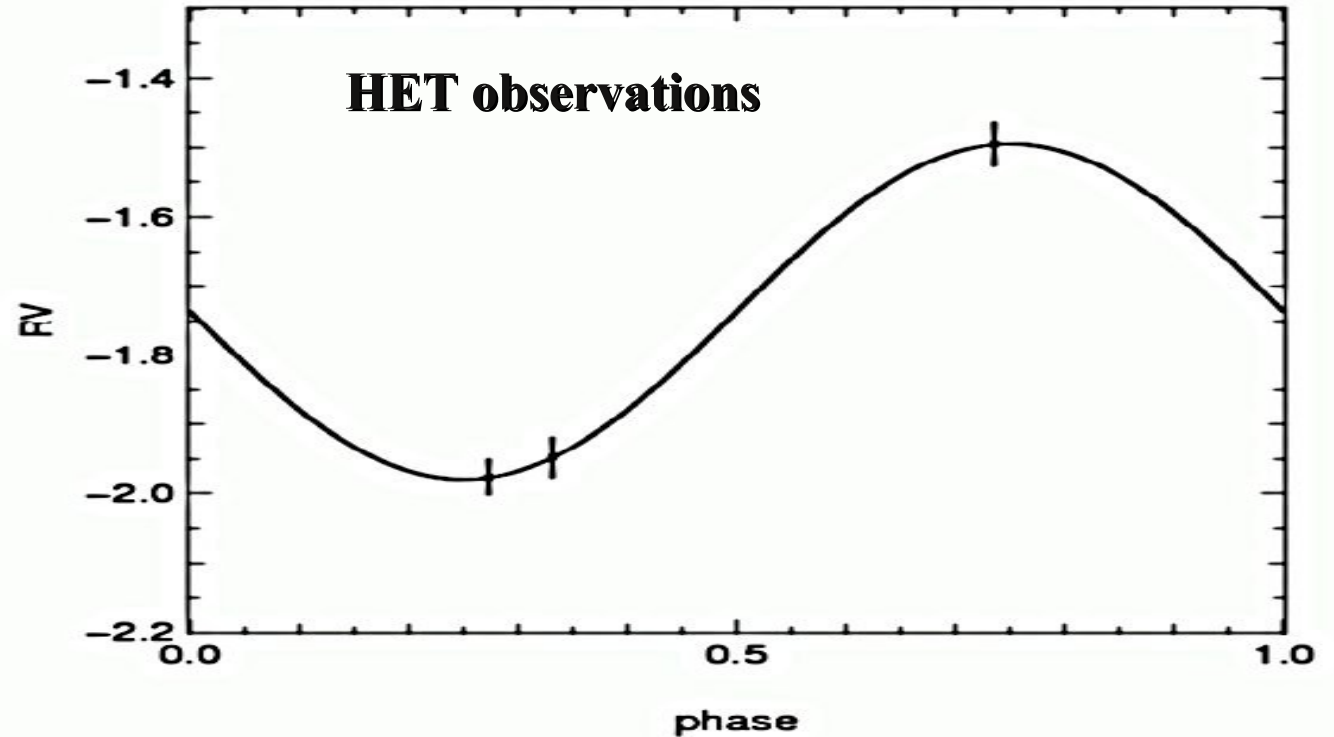
$J = 15.4$ mag

$\Delta F/F = 0.02$

$R_p = 1.8 R_{Jp}$

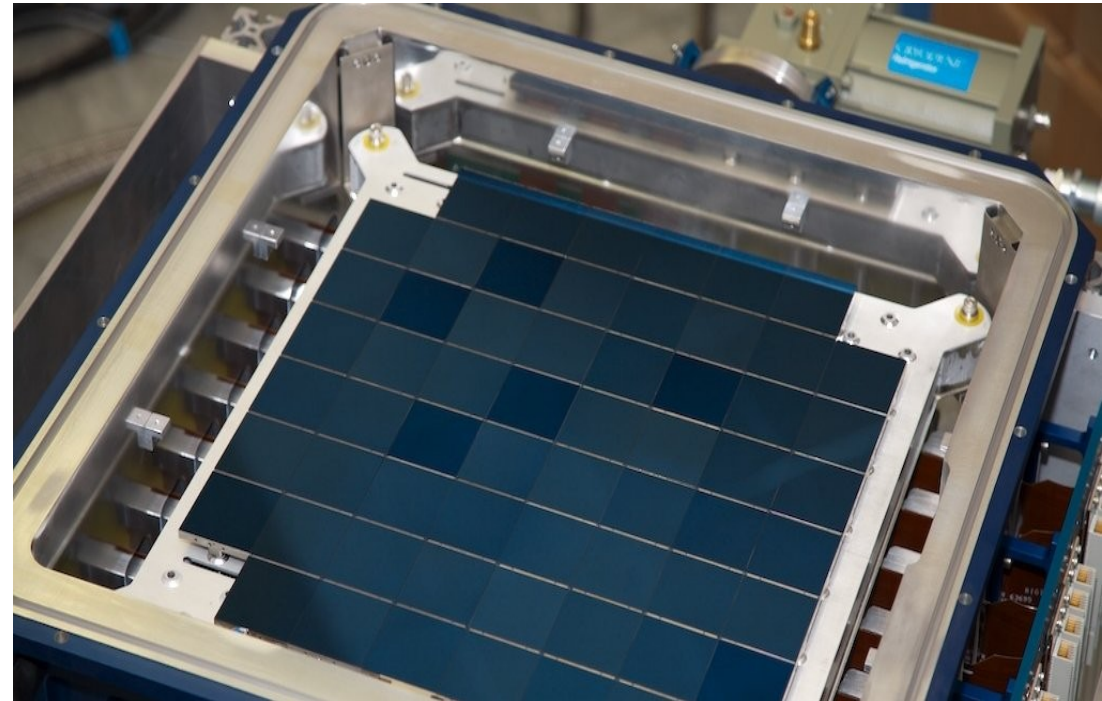
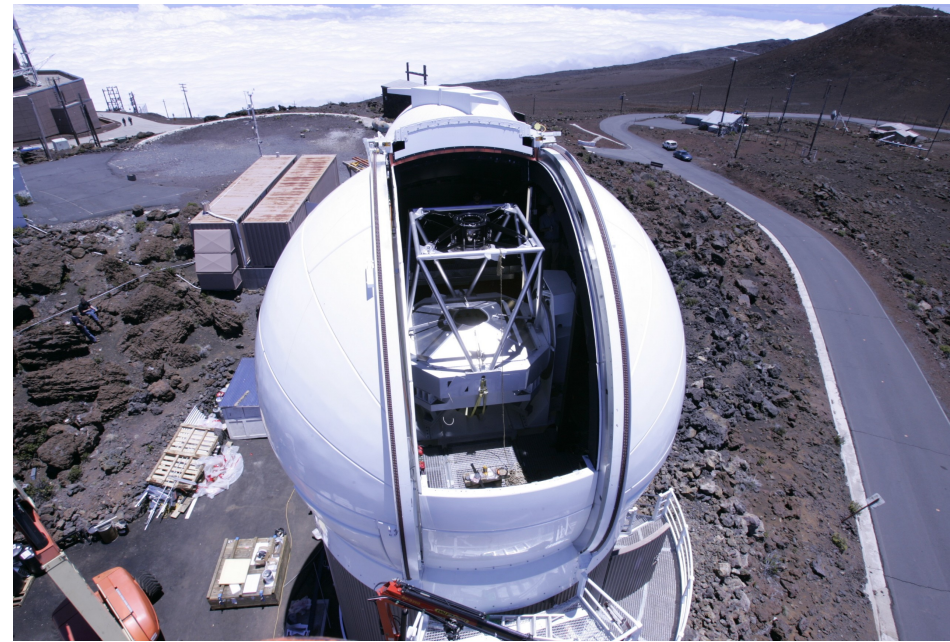
$\Delta RV = 242$ m/s

$M_p = 2.1 M_{Jp}$



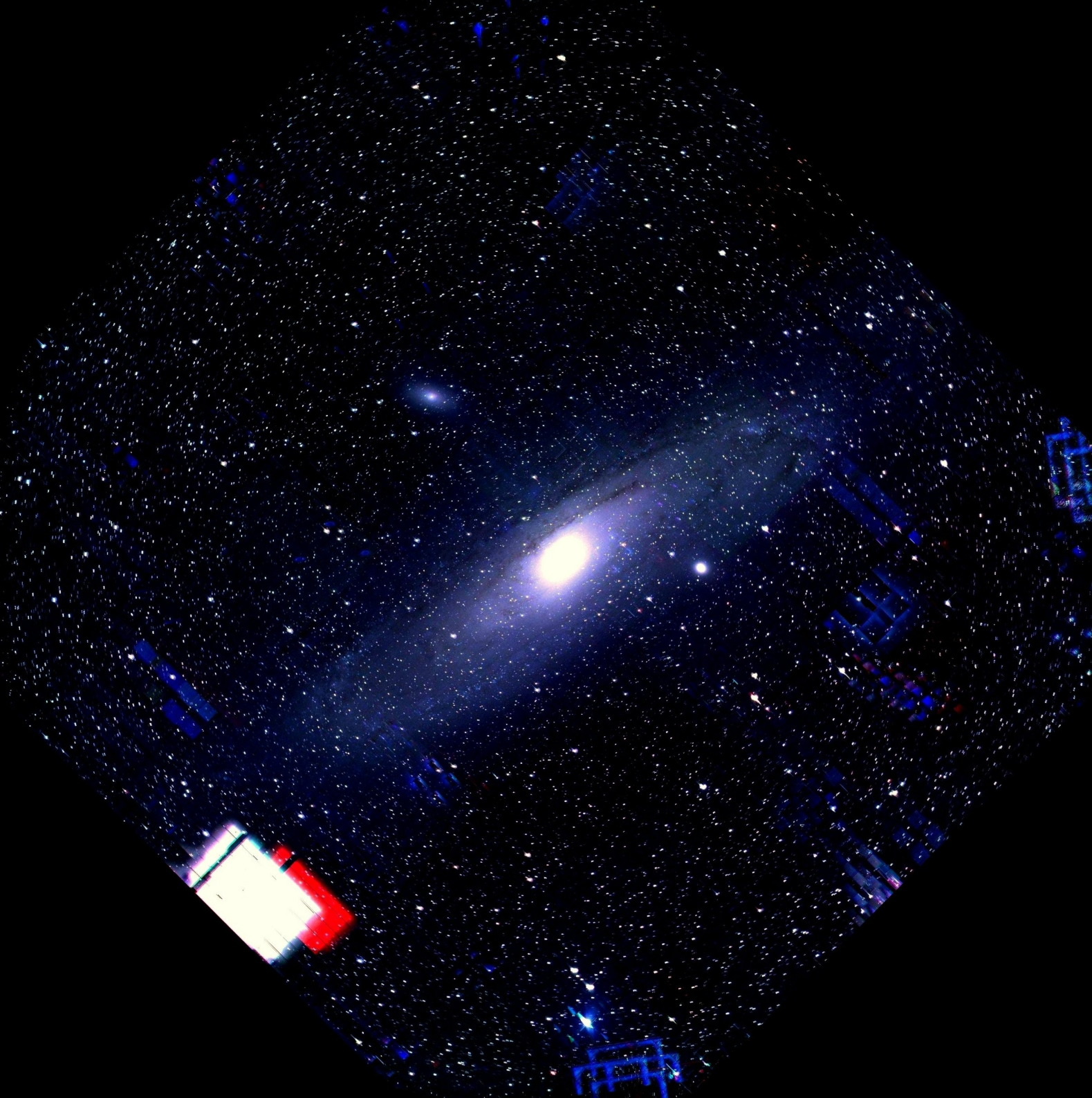
Pan-STARRS 1:

- 1.8m telescope, 7 sq.deg. FOV
- 60 8x8 arrays of 600x600 pixel CCDs
- fast readout: ~10s
- first light: 08/2007
- ORR: early 2009





- 1.8m t
- 60 8x
- fast re
- first li
- ORR:



Pan-Planets 2010-2012:

MPIA (C. Afonso, Th. Henning) & the PS consortium

- 3 fields in Sagitta (7 sq. deg. each)
- ~ 100.000 dwarfs ($13 \leq i' \leq 17$) per field
- 80h observations in first campaign (1h blocks)
- 30s exposure time
- ~ 2000 images per field
- spectroscopic follow-up with HET and Keck

Wendelstein Observatory:



Goal of the Wendelstein 2m Telescope Project the Fraunhofer telescope

Ulrich Hopp¹²

(University Observatory Munich, LMU¹ & MPE Garching²)

for the Wendelstein Telescope Team:

Ralf Bender¹², Frank U. Grupp²¹, Heinz Barwig¹,

Claus A. Gössl¹, Florian Lang-Bardl¹,

Wolfgang Mitsch¹, Maximilian Fabricius²,

Hu Shao Ming³²¹

(Shandong University Weihan³)

(see also: Hopp et al. 2010 SPIE 7733, 5)

(Therde GmbH Munich)mbH Munich)



Conceptual design drawing by
manufactures

Kayser-Threde GmbH Munich &

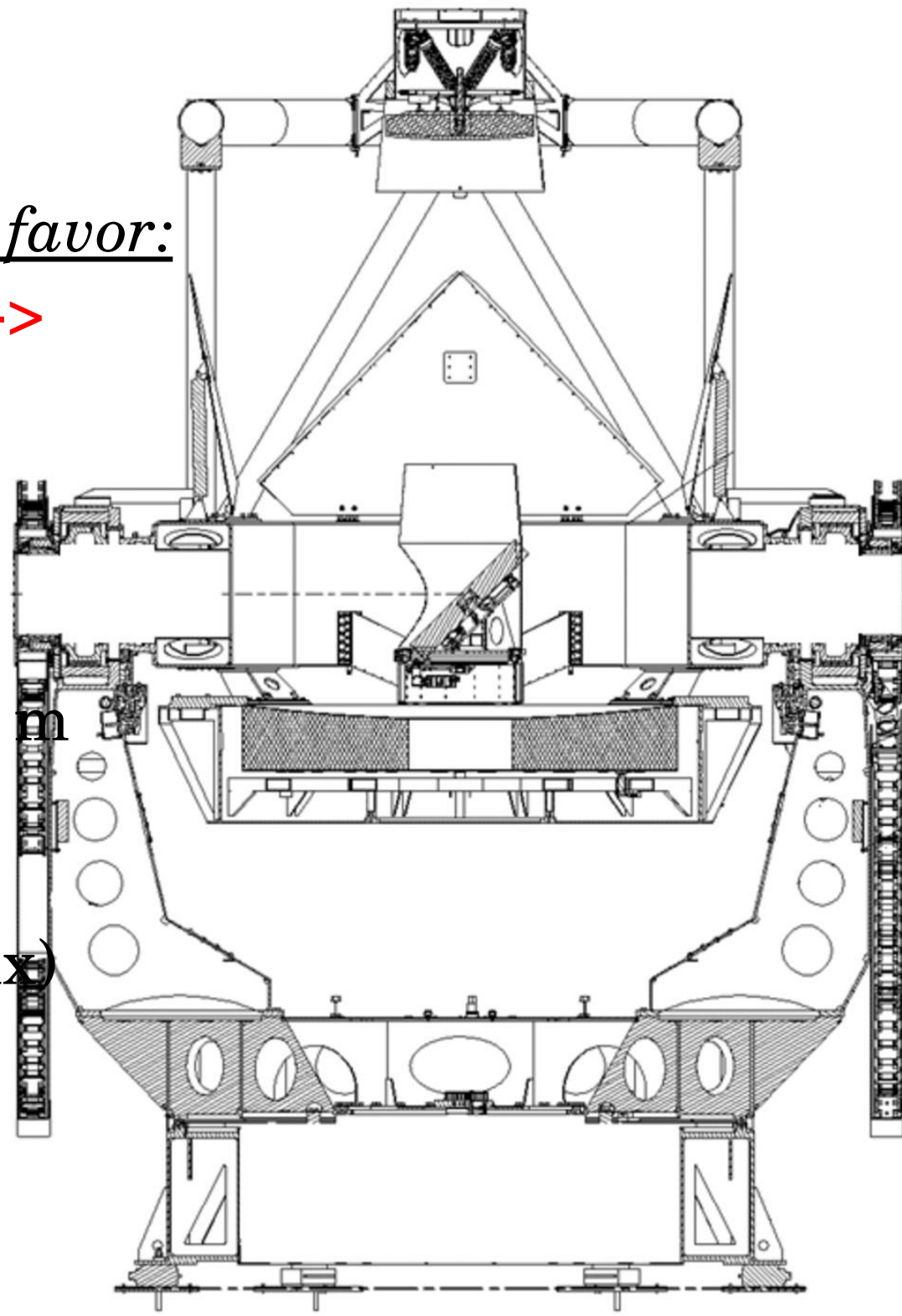
Astelco Systems GmbH Martinsried



Telescope Design

science & site constraints favor:

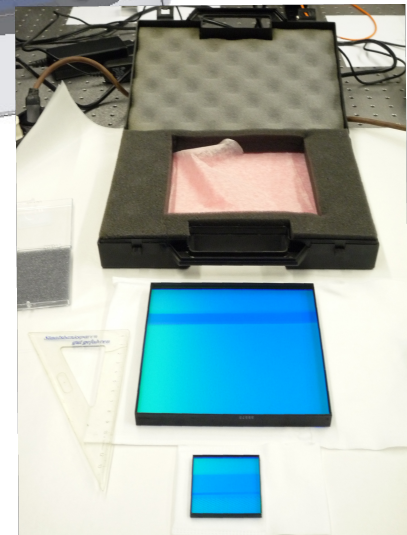
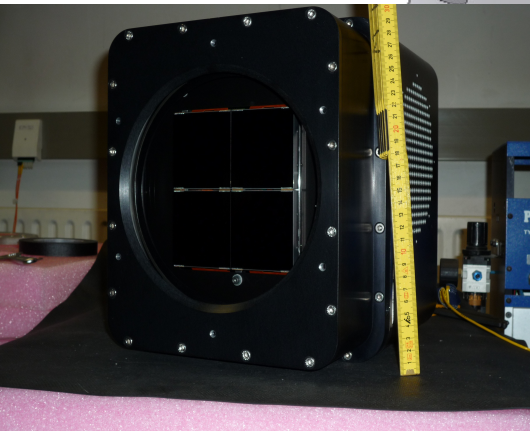
- compact design: alt.-az. ->
- **three** mirrors ->
- two Nasmyth stations
 - one with corrector for $\geq 0.7^\circ$ [0.9°] \emptyset f.o.v.
 - back focal distance 0.5 m
- **0.2"/15 μ m** pixel
- **low** ghost brightness
- small distortion (≤ 0.2 pix)
- instrument load, twister
- remote/robotic control



Wide field imager WWFI: $0.5^\circ * 0.5^\circ$

(PM: C. Goessl, see SPIE 7735-112)

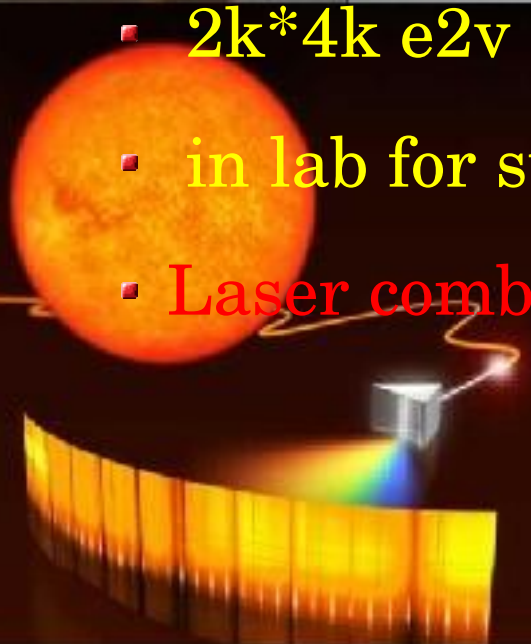
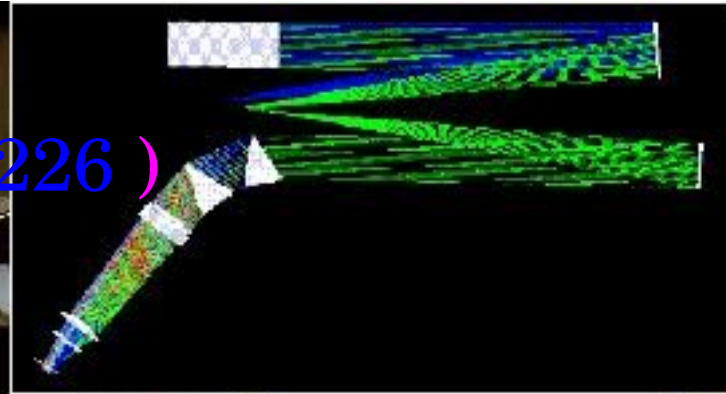
- 4kx4k, 15 μm e2V mosaic (*Spectral Instrument Tucson*)
- 0.2"/pixel
- 2 filter wheels (*Altmann/Leicht Bamberg*) – 8 positions
- ugriz available (150 mm square *LaserComponents/Omega*)
- Bonn shutter



High-resolution spectrograph FOCES

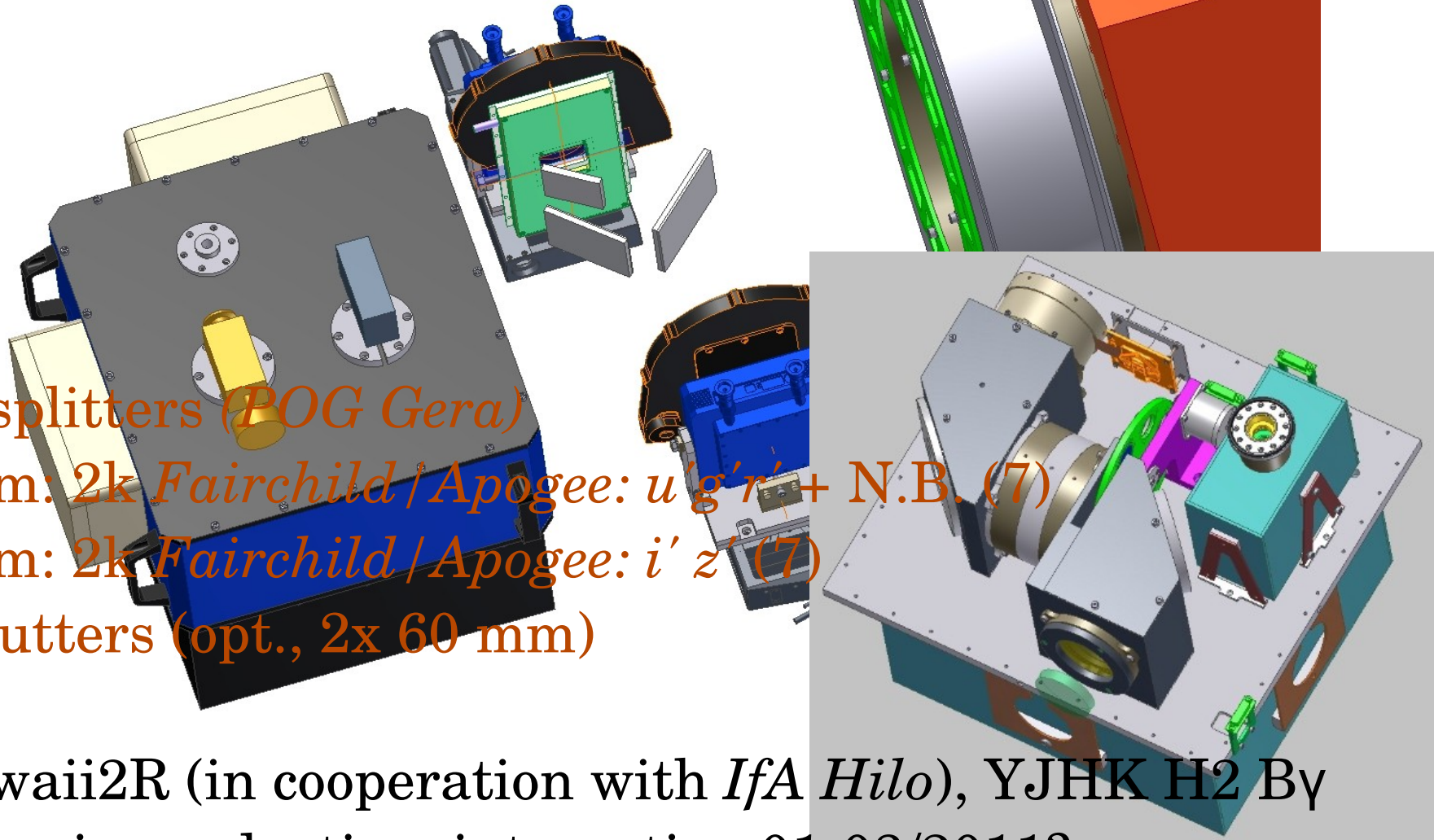
(PM: F. Grupp, see SPIE 7735-226)

- one fiber
- *upgrade after 14 yr at Calar Alto 2.2m*
- $R \sim 70.000$
- $2k*4k$ e2v 13.5μ (Andor)
- in lab for stabilization tests
- Laser comb (with T. Haensch)



3 channel optical-NIR camera 3KK: 8.5' * 8.5'

(PM: Lang-Bardl, see SPIE 7735-133)



- 2 beam splitters (*POG Gera*)

- $\lambda < 695$ nm: 2k *Fairchild* / *Apogee: u'g'r' + N.B. (7)*

- $\lambda < 970$ nm: 2k *Fairchild* / *Apogee: i' z' (7)*

- Bonn shutters (opt., 2x 60 mm)

- NIR Hawaii2R (in cooperation with *IfA Hilo*), YJHK H2 B γ

- mechanics in production, integration 01-03/2011?

Field spectrograph VIRUS-W

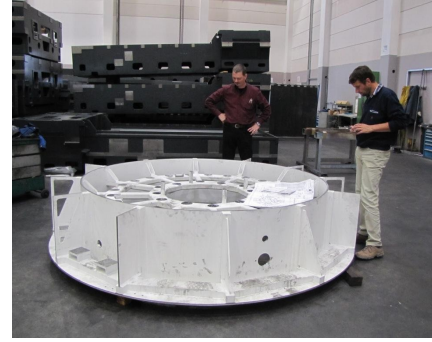
(PM: M. Fabricius, see SPIE7014-216)

IFU head

- 267 fiber IFU (*Frank Optics*) covers 2' by 1' (fill factor 1/3)
- 4.2"/fiber core
- $R \sim 2100$ or 7500 at Mgb
(2 VPH grism by *KOSI - Kaiser Optical Sys.*)
- f/1.4 lens camera (*POG*)
- 2k*4k e2v (*Spectral Inst. Tucson*)
- shipped to McDonald 2.7m Sep. 2010

Status & time line

- ✓ telescope pier & dome ready
- under construction:
 - air condition, electrical cabling etc.
- M1, M3 polished & accepted (Sep 15, 2010)
- M2 on polishing table (due Oct 26, 2010)
- corrector lenses: in production by POG Gera, due late 2010
- mount: production started (incl. cells, twister etc.; due Oct 2010 for parts)
- machine shop integration late 2010 / early 2011 (incl. full integration tests at star with “WWFI”)
- telescope observatory integration summer 2011
- until 2012 commissioning instruments & telescope tests



First Generation Instruments

- Imager:

- optical Wide Field Imager WWFI (PM: C. Gössl)
- optical-NIR 3 channel camera 3KK (PM: F. Lang)

- Spectrographs:

- fiber IFU coupled field-spec. VIRUS-W (PM: M. Fabricius)
- fiber coupled high-resolution spec. FOCES (PM: F. Grupp)

