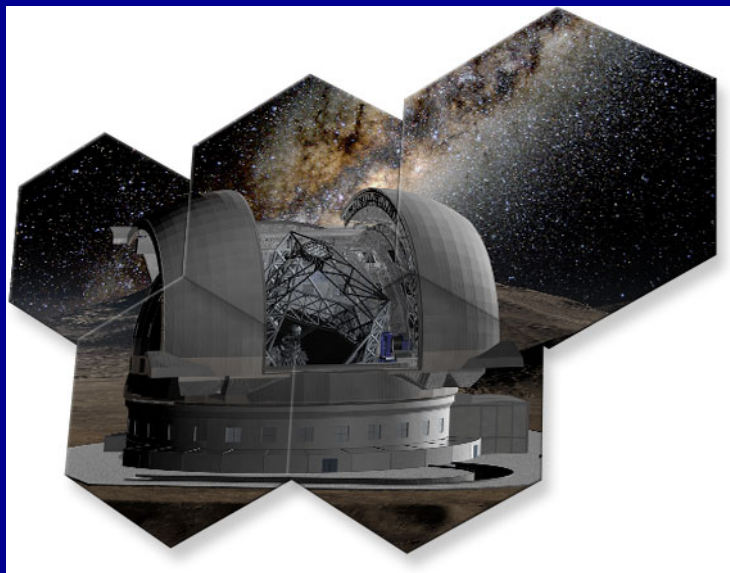




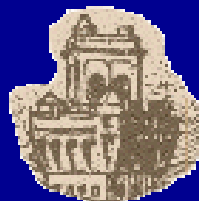
INAF *progetto premiale* awarded by MIUR

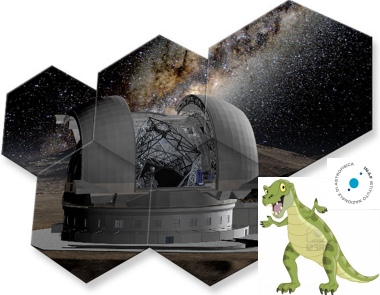
Monica Tosi

INAF – Osservatorio Astronomico di

Bologna

Bologna, November 21st 2014

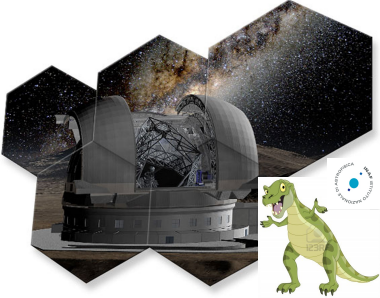




Progetti premiali

Following a decision taken by Berlusconi's Government, every year MIUR takes 7% of their budget out of all its Research Institutes (EPR: INAF, INFN, CNR, etc.) and is supposed to redistribute that money to national projects presented by the EPRs, and selected on a competitive, peer review basis. These projects are dubbed *progetti premiali*.

The selection is made by a MIUR committee made of VIPs of heterogeneous competences (not necessarily including an astrophysicist).



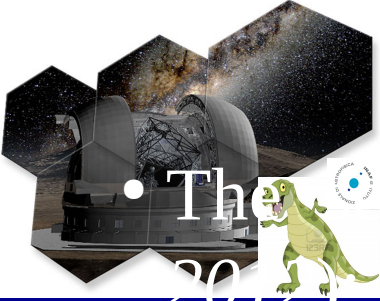
Progetti premiali 2011

At the end of 2011 MIUR issued the first call for *progetti premiali*; deadline January 2012.

INAF presented 4 such applications and got 3 approved (E-ELT, LBT, VLT).

The total allocation to INAF (10.6 Meuro, approved in June 2012, actually assigned at the end of 2012) turned out to be fairly higher than 7% of its budget.

INAF applied an overhead of 10% to each *premiabile* to support research in general (e.g. PRINs, PhD grants, institutes).



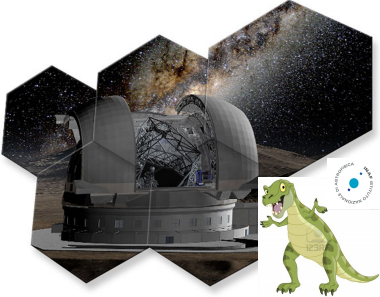
Progetti premiali 2012

• The second call was issued on 19/12/2012 (*premiali 2012*), deadline February 2013; this time for 3 types of projects:

- 1) Projects already approved in the past or part of joint European proposals,
- 2) interdisciplinary/transversal projects,
- 3) Projects to support/upgrade European/international infrastructures.

INAF presented 8 applications (+1 under INFN, and 1 under ASI) and got 5 approved (E-ELT, LBT, CTA, ALMA and WOW) in September 2013 for a total of 17.693 Meuro, then cut down to 15.911 in March 2014 for political reasons; again much more than 7%). Funds arrived in May 2014.

INAF overhead 15%.

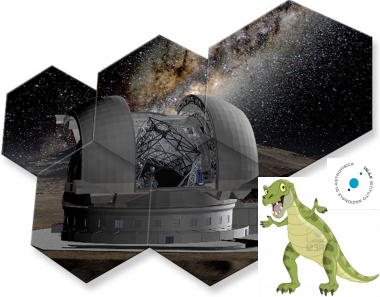


Progetti premiali 2013

In 2013 MIUR has decided (contrary to what is stated in the law) to skip the *premiali*'s call, and allocate the “7% funds” on the basis of the ANVUR-VQR results. This was called *premiabilità* in analogy with the *progetti premiali*.

The allocation to INAF has been 13.7 Meuro, approved in March 2014 (again, much higher than 7% of its budget).

INAF is going to use the *premiabilità* to support research in general (e.g. PRINs, PhD grants, institutes) and pay what is needed for our share in e.g. LBT, E-ELT.



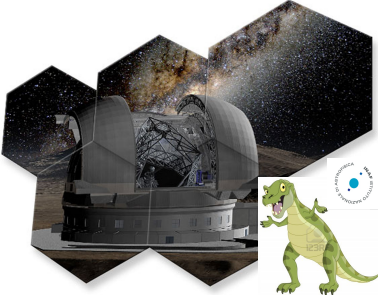
Progetti premiali 2014

In 2014 MIUR will apparently devote 30% of the 7% budget to a new call for *premiali*, and allocate the remaining 70% on the basis of the ANVUR-VQR results.

If this is confirmed, INAF's 30% is only ~1.5 Meuro, and even if we perform very well, we cannot expect to get more than 3 Meuro => equivalent to only 1 *premiabile*.

We must be very careful and propose 1 or, at most, 2 *premiali* with very compelling cases.

No idea yet on the MIUR guidelines and requirements



Progetto premiale on E-ELT: T-REX-1 and T-REX-2

PI: M. Tosi

Requested duration: 3 years

Requested budget: 3.9+3.5+... M€

Financed duration: each time 1 year

Allocated budget: 3.9 M€ (-10% 1st year) + 2.7 M€ (-15% 2nd year)

Kickoff meeting T-REX-1 28/9/2012

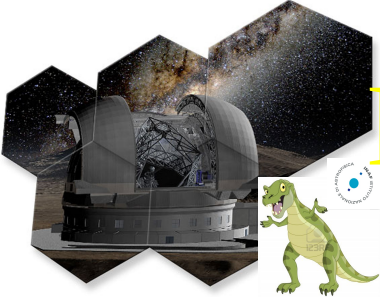
National meeting (open to whole community + ESO) 14/1/2013

Kickoff meeting T-REX-2 28/5/2014

Final meeting planned in July 2015

Participants:

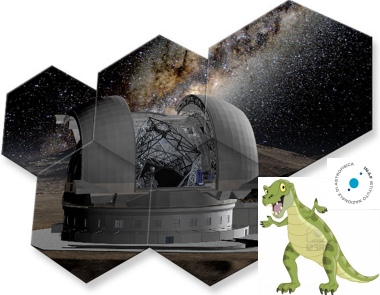
more than 100 researchers, distributed over most of the
INAF institutes and 6 universities.



Kickoff meeting T-REX-2

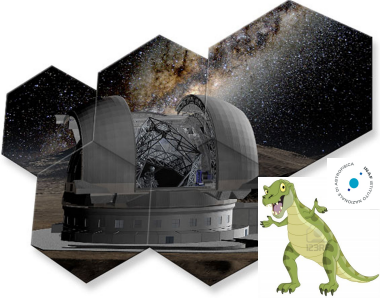
Merate 28-5-2014





T-REX: Main Objectives

- **Strengthen the position and role of INAF and Italian Universities in the international consortia**, currently under development, for the realization of the E-ELT instruments.
- **Support the executive design phase of the E-ELT instrumentation, strengthening facilities and laboratories.**
- **Promote the formation of young researchers to be employed in the design and construction of instrumentation for the E-ELT** via training by highly qualified personnel.
- **Develop new technologies to ensure the feasibility of the E-ELT instruments.**
- **Ensure the maintenance/enhancement of scientific and industrial know-how.**
- **Promote integration processes between research institutes, universities and industry.**
- **Promote the transfer of technology from the field of astronomical instrumentation to other fields such as renewable energy, medical technologies, information technology and communication and to technologies aimed at nano-electronics using lithographic techniques.**

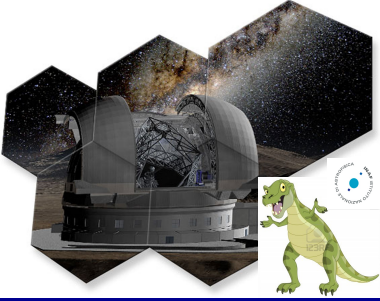


T-REX

Operating Units

(and coordinators)

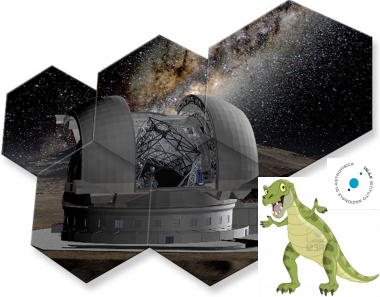
- OU-1 ELT-INAF COORDINATION
- OU-2 ELT-MIRRORS
- OU-3 ELT-CAM
- OU-4 ELT-HIRES
- OU-5 ELT-MOS
- OU-6 ELT-PCS



Management (1)

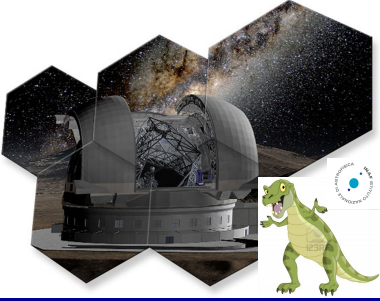
T-REX is managed in tight connection with the INAF Science Directorate (as all science and technology projects of national and international relevance must)

- We discuss with the Science Director all the major issues/needs.
- We have decided together how to distribute the funds awarded to T-REX



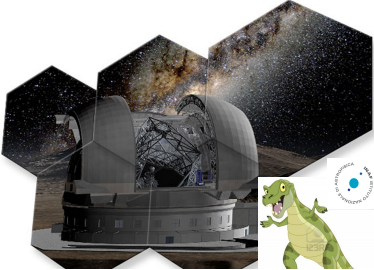
Management (2)

- The OU coordinators are in charge of the activities of their OU, of their financial and FTE requests, and are responsible for the allocated resources.
- The members of OU1 are in charge of the coordination of the OUs and of discussing the allocation of resources.



First year (in practice 2013)

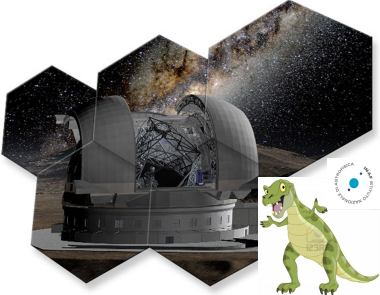
- For h/w investment we have given highest priority to activities for projects related to E-ELT first light:
 - 2.7 M€ to OU2-MIRRORS for Metrology Lab
 - 1.5 M€ to OU3-CAM for MaoryBut with full support also to Micado, HIRES, MOS and PCS
- We allocated 1.2 M€ to the OUs for 15 FTEs and 60 K€ for mobility.



Second year

(in practice mid 2014 – mid 2015)

Macro-voce	Capitolo di Spesa	OA Fi	OA Mi	IASF Mi	OA Bo	IASF Bo	OA Pd	OA Na	OA Ct	OA Ts	OA Rm	Totale
Personale	TD	0	150	0	0	27	0	0	0	53	53	283
	Borse/Assegni	210	0	34	0	0	316	56	0	0	68	684
	Dottorati	60	60	0	60	0	0	0	0	0	0	180
	Co.Co.Co e Co.Co.Pro.	0	0	0	0	50	0	0	0	0	0	50
Attrezzature	Attrezzature Scientifiche	118	124	0	70	12	19	3	21	0	25	392
	Impianti e attrezzature	200	0	0	0	7	0	0	0	0	0	207
Spese Correnti	Materiale di Consumo	36	30	0	20	2	6	1	9	0	0	104
	Altre Spese Servizi ...	0	0	0	244	12	0	0	0	0	0	256
	Convegni ecc.	0	0	0	17	0	0	0	0	0	0	17
	Pubblicazioni	0	0	0	0	0	3	0	0	0	0	3
	Canoni software	0	0	0	0	15	0	0	0	0	0	15
Missioni	Missioni	75	10	10	67	0	27	0	0	0	0	189
Totale		699	374	44	478	125	371	60	30	53	146	2380

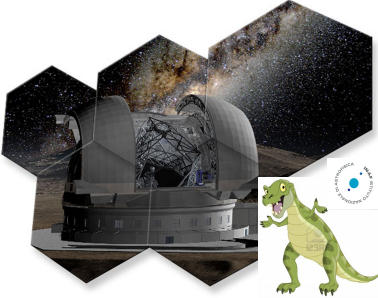


Second year

(in practice mid 2014 – mid 2015)

We have given higher support to the OU with higher chances of Italian success:

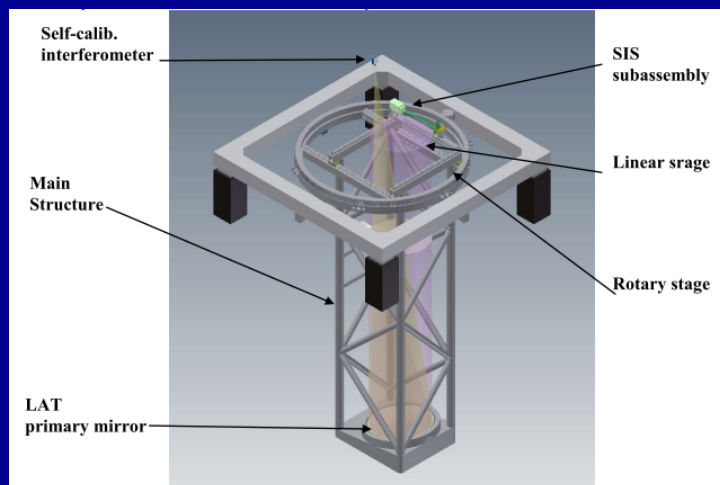
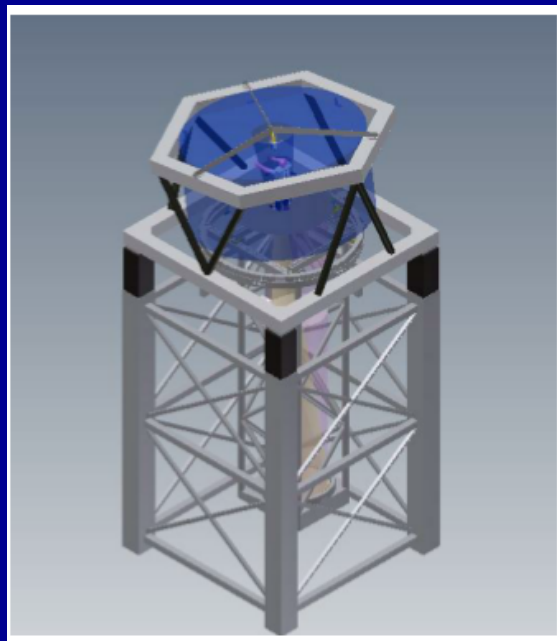
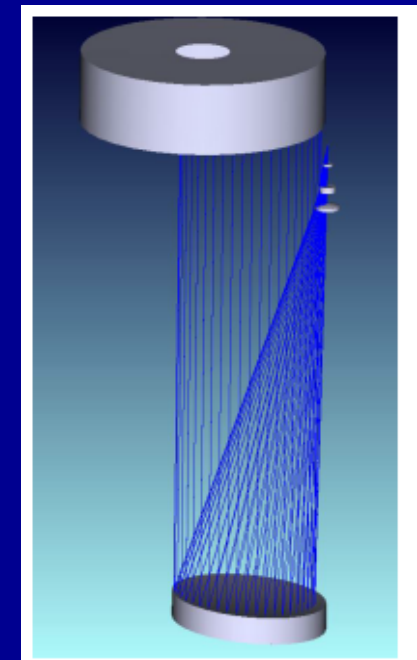
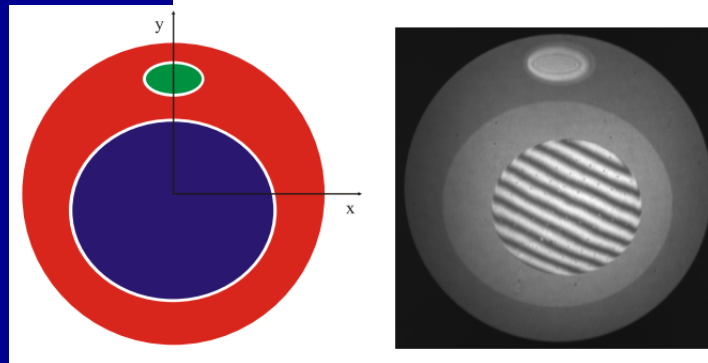
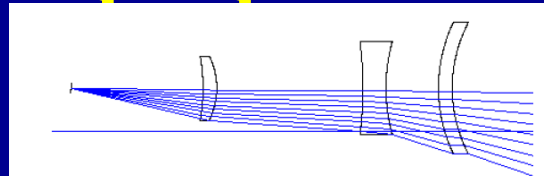
- ▮ 37 K€ to OU1 (OABo) for coordination activities
- ▮ 374 K€ to OU2-MIRRORS in OAMi
- ▮ 1.2 M€ to OU3-CAM for Maory/Micado (0.4 to OABo, 0.3 to OAFi, 0.3 to OANa, 0.1 to OAPd)
- ▮ 530 K€ to OU4-HIRES (394 to OAFi, 53 OATs, 53 OARm)
- ▮ 137 K€ to OU5-MOS (44 IASF-Mi, 93 OARm)
- ▮ 108 K€ to OU6-PCS (OAPd)

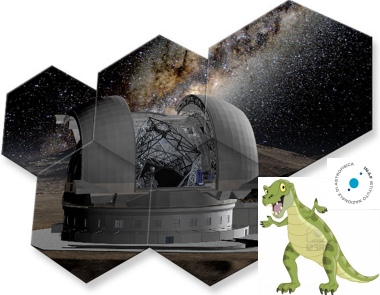


LISA CC2: E-ELT Mirrors (from Giovanni Pareschi)

M4 optical test layout under

- Baseline Vertical:
- Null Lens
- CGH





T-REX OU2: E-ELT Mirrors (from Giovanni Pareschi)

Facilities operated @ INAF-OAB

Facility 1

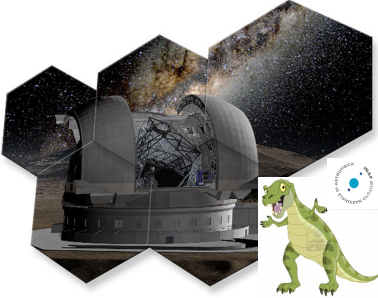


Mirrors up to 350 mm in diameter

Facility 2



Mirrors up to 1500 mm in diameter



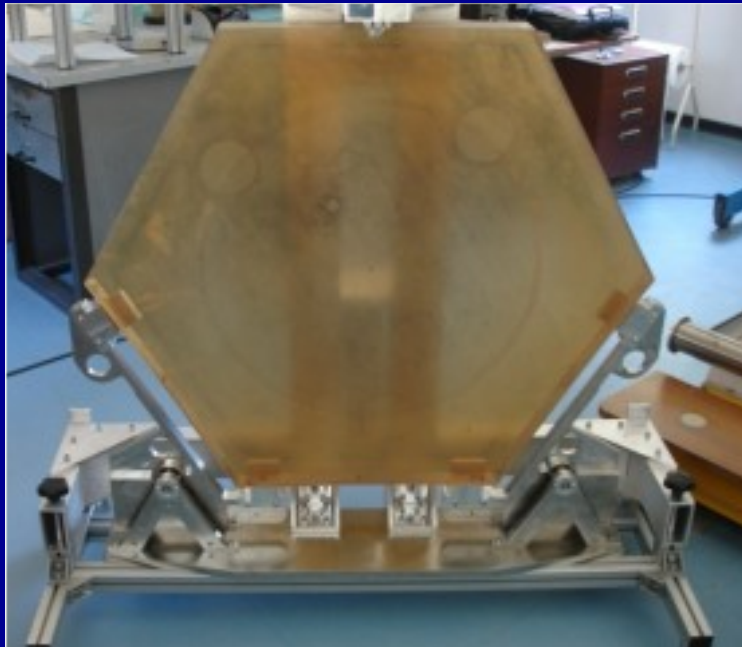
Segui @mediainaf

T-REX OU2

Lavorazione IBF prototipo segmento M1

g+1

Tweet



- Nei laboratori di Merate dell'INAF-Osservatorio di Brera, tramite la sofisticata tecnica chiamata Ion Beam Figuring, è stato lavorato uno specchio prototipale rappresentativo dei quasi 800 segmenti che formeranno lo specchio primario dell'European Extremely Large Telescope (E-ELT).
- Partendo da un errore di forma di 100 nanometri lo specchio, della dimensione di 1 metro, è stato portato a un errore di forma complessivo di appena 12 nanometri, quasi un fattore 10 inferiore e meglio delle specifiche, che prevedono un errore massimo di 20 nanometri (si ricorda che 1 nanometro è pari a un milionesimo di millimetro).

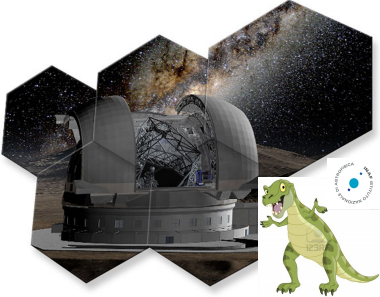
**PROGETTI PREMIALI
E -ELT 2012 E 2013 -
T-REX 1 E T-REX-2**

ASSEGNI DI RICERCA	Tipo contratto	Durata	Inizio	Scadenza	lordo contratto	Fondi	Progetto	Referente
PARIANI Giorgio	Assegno Ricerca	24 mesi	15/05/13	14/05/15	64.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
VECCHI Gabriele	Assegno Ricerca	24 mesi	01/07/13	30/06/15	32.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
CIVITANI Marta	Assegno Ricerca	24 mesi	01/01/14	31/12/15	64.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
LANDONI Marco	Assegno Ricerca	24 mesi	01/05/14	30/04/16	28.000,00	1.05.06.3.01	Premiale E-ELT T-REX	Zerbi
BERNARDINI Maria Grazia	Assegno Ricerca	12 mesi	01/09/14	31/08/15	28.000,00	1.05.06.03.02	Premiale E-ELT T-REX 2	Pareschi
SALMASO Bianca	Assegno Ricerca	24 mesi	01/01/14	31/12/15	38.734,00	1.05.06.3.01	Premiale E-ELT T-REX	Zerbi
TOTALE					254.734,00			

BORSE DI RICERCA	Tipo contratto	Durata	Inizio	Scadenza	lordo contratto	Fondi	Progetto	Referente
FRASSONDI Daniela	Borsa di Ricerca	12 mesi	01/04/13	31/03/14	24.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
BORSA Francesco	Borsa di Ricerca	12 mesi	01/07/13	30/06/14	18.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
PELLICIARI Carlo	Borsa di Ricerca	12 mesi	01/08/13	31/07/14	26.000,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
MOSCHETTI Manuele	Borsa di Ricerca	9 mesi	01/09/13	31/05/14	12.150,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
COLELLA Letizia	Borsa di Ricerca	12 mesi	15/01/14	14/01/15	22.500,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi
COLELLA Letizia	Borsa di Ricerca	12 mesi	15/01/15	14/01/16	22.500,00	1.05.06.03.01	Premiale E-ELT T-REX	Zerbi

Inoltre  Ph.D. Univ. Insubria: Matteo Genoni 62000 Euro

ALTRE SPESE	FORNITORE	Importo	Progetto
Sistema di metrologia meccanica	CAM 2 FARO	189.365,00	T-REX
Formazione x sistema di metrologia meccanica	CAM 2 FARO	9.120,00	T-REX
Pompa per vuoto	Pfeiffer Vacuum	17.595,87	T-REX
Apple MacBook	Rekordata	2.280,85	T-REX
2 Apple MacBook Pro 15"	Rekordata	6.355,40	T-REX
Switch HP	Tecnodelta	2.949,01	T-REX
frigorifero per laboratorio	SMEG	2.415,60	T-REX
allestimento laboratorio	Physik Instrumente	34.110,80	T-REX
componenti optomeccanici	Edmund Optics	2.721,89	T-REX
ottica per interferometro	Soliton Laser	6.359,86	T-REX
camera Aspen e chiller	Megapixel Systems	7.955,00	T-REX
banchi ottici	DB Electronic Instruments	25.900,60	T-REX
gru a 3 assi con inverter	ASTER	15.805,10	T-REX
interferometro x misure a fronte d'onda	Engineering Synthesis Design	158.172,23	T-REX
sistema piezoelettrico x obiettivi Nikon	Piezsystem Jena	2.407,67	T-REX 2
sensore da vuoto	Pfeiffer Vacuum	2.586,01	T-REX 2
tubi catodi	Veonis Technologies	2.979,24	T-REX 2
colla x integrazione specchi	Master Bond	2.080,96	T-REX 2
filtri clean room	Novaria Technologie	3.538,00	T-REX 2
lavorazione grinding di 2 mould	Andalò Gianni	5.368,00	T-REX 2
lavori di rifinitura laboratori	Maggi Enrico	5.702,89	T-REX 2
analisi termo strutturali di specchi in vetro	Eder Josef	47.580,00	T-REX 2
subcontratto x attività del progetto T-REX 2	CIFS	21.000,00	T-REX 2
riflettometro spettrale x bande UV/VIS/NIR	Filmetrics Europe	18.073,69	T-REX 2



TREX-1 OU3: E-ELT CAM
(from Emiliano Diolaiti)

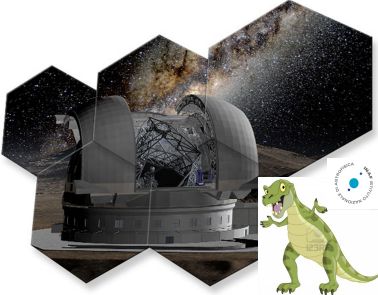
□ Progetto MAORY

□ Consolidamento

Project Management

Plan e Consorzio in

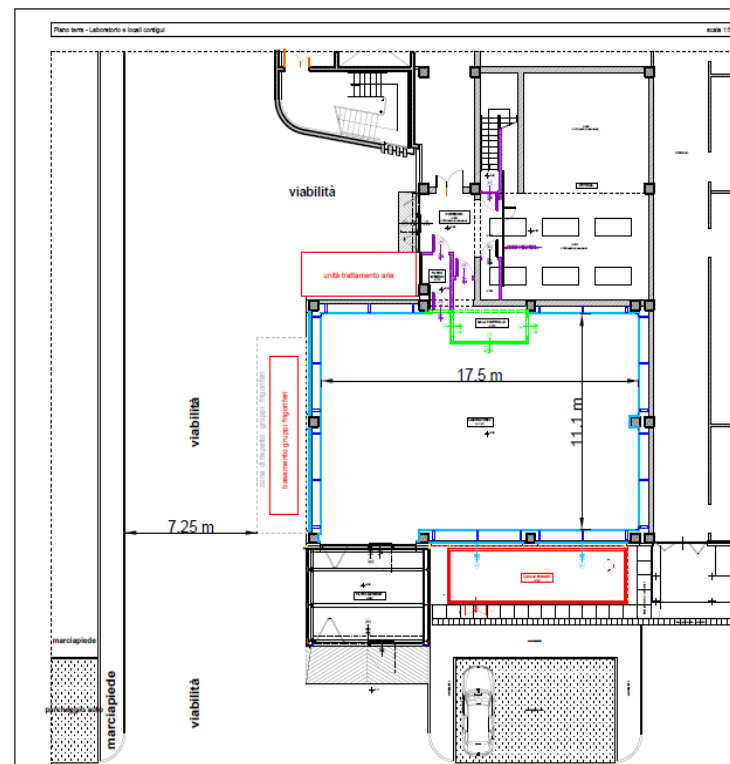
U. I. •

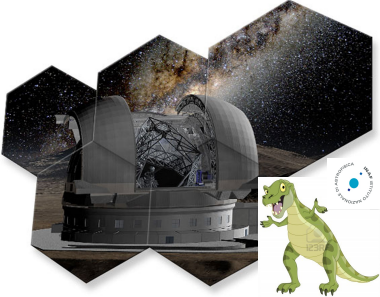


Sala di integrazione MAORY c/o IASF-Bologna



Finanziamento Progetto Premiale E-ELT 2012.
 Importo totale 850 k€ (Delibera CdA INAF 86/2013).
 Progetto definitivo dei lavori completato, in attesa di
 ultima autorizzazione (Comune di Bologna) prima di
 avviare il procedimento di affidamento dei lavori.





TREX-2 OU3: E-ELT CAM

(from Emiliano Diolaiti)

□ Progetto MAORY

- Organizzazione del progetto in vista dell'inizio della fase B (prevista per metà 2015)
- Attività di sviluppo (studio opzioni progettuali, nuove tecnologie di ottica adattiva)
- Studio di fattibilità specchi deformabili con attuatori voice-coil (procedimento in fase di definizione)
- Acquisizione attrezzature e strumentazione di supporto allo sviluppo dello strumento

□ Progetto MICADO

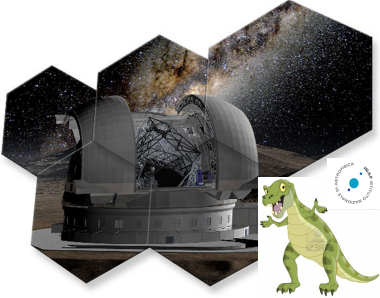
- Studio casi scientifici (popolazioni stellari in galassie, proprietà di galassie ad alto redshift) mediante simulazioni del sistema MAORY-MICADO

□ Progetto caratterizzazione parametri atmosferici

- Studio di metodi di previsione delle proprietà statistiche della turbolenza ottica

□ Contratti previsti

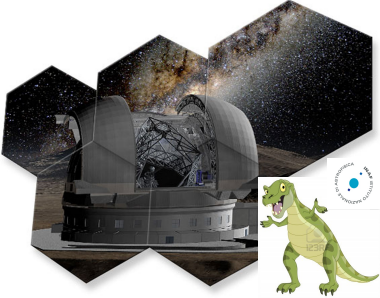
- Ca. 5 assegni di ricerca, 1 borsa di studio, 1 TD (co-finanziato su fondi del progetto premiale iAlma), 1 borsa di dottorato di ricerca



TREX OU4: E-ELT HIRES

(from Tino Oliva)

- Set-up international collaboration ready to create consortium in response to ESO call. Consortium includes all European groups interested in HR spectroscopy. Italian PI-ship.
 - White-book (scientific cases) released.
- Blue-book (technical overview) to be released in Dec 2014.
- Most funds used/foreseen for travel/meetings and contracts
 - Contracts activated in TREX-1
 - 1 Engineer: fibres and opto-cryo-mechanics (Arcetri)
 - 1 Astronomer: data analysis, simulations and E.T.C. (Arcetri)
 - Contracts (to be) activated in TREX-2
 - Extensions of TREX-1 contracts
 - 1 Engineer: controls and electronics (Trieste)
 - 1 Astronomer: proto-planetary disks and jets (Monteporzio)



TREX OU5: E-ELT MOS

(from Bianca Garilli)

WP2 IASF-Mi

□ People: B.Garilli, P.Scala, M.Fumana, P.Franzetti

□ Activities

□ Start writing typical use cases and s/w functional specification

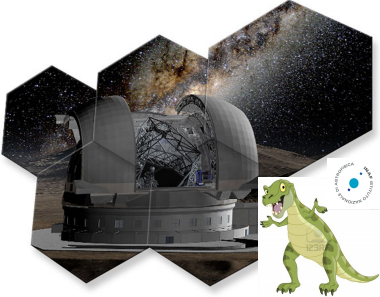
□ Study of the different coordinate transformation involved and flow down of the required steps

□ Procedures to assign one temporary position: deadline 31 october, evaluation of CVs and publication list november 18. We received 3 application. An oral examination, if required, will be done mid december

□ Next steps

□ Finish the specification of the functional specifications

□ First implementation of a demonstration prototype



TREX OU5: E-ELT MOS

(from Bianca Garilli)

WP 1 and 3: OA-Roma

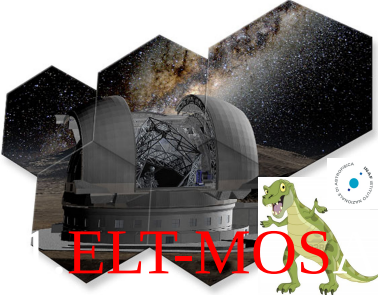
- people and science activities (*contracts*):

1. Fiore Fabrizio
2. Fontana Adriano
3. Giallongo Emanuele
4. Pedichini Fernando
5. Pentericci Laura
6. *Bongiorno Angela*
7. *Stangalini Marco*

- Publications:

“Science Case and Requirements for the MOSAIC Concept for a Multi-Object Spectrograph for the European Extremely Large Telescope.” <http://arxiv.org/abs/1406.6369>

Pedichini F., Bartoloni A.:SDW2013 - In press. “Architectures for a CMOS imager at the focal plane of an ELT.”



T-REX OU5

Activities in progress and *planned*:

1. IC meetings and discussions participation about AO and WF sensing detectors

2. Procurement and test of a fast sCMOS imager for evaluation and astronomical tests about ms. exposure imaging with XAO

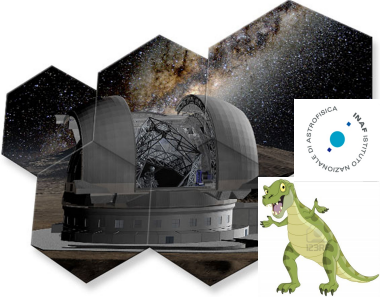
3. Preliminary Study for PIXEL-ONE: a novel technology to build array of replicable intelligent one-pixel detectors tailored to the direct imaging and AO wave-front sensing of ELTs

4. *Application of the modular concept to the XAO for the ELT using PIXEL-ONE and zonal AO control*

5. *1yr TD Grant for AO simulation starting first qt. of 2015 (to be extended to 3+ years) and 1yr Research Grant for MOSAIC science on 2015*

6. *Procurement of a batch of prototype PIXEL-ONE detectors via Euro Practice*

7. *Procurement of a 16x16 electrostatic MEMS deformable mirror for evaluation of their application in open loop control of AO system for*



PCS: E-ELT Planet finder

Raffaele Gratton
INAF-Osservatorio Astronomico di
Padova

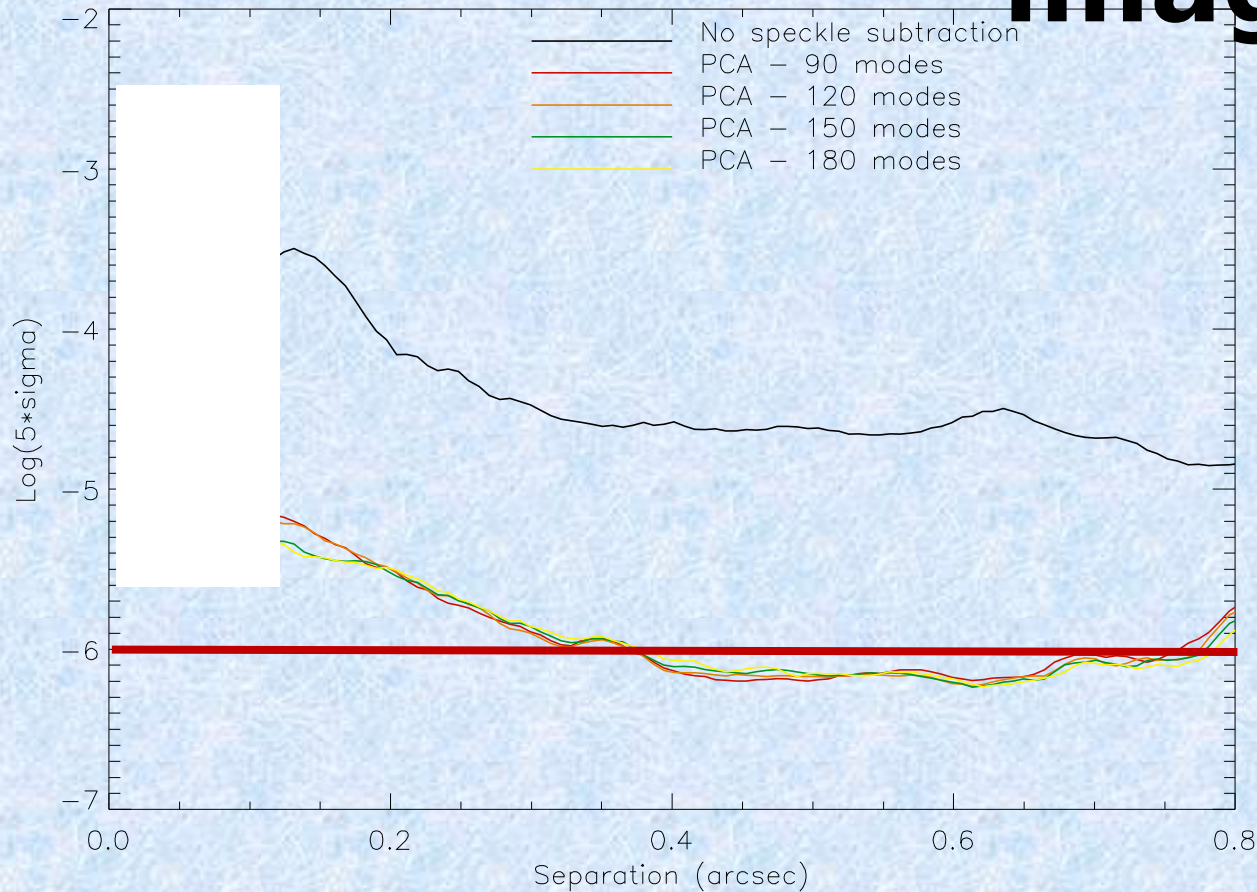
Italian activity for PCS

- Development and application of high contrast imaging techniques
 - SPHERE
 - High Contrast imaging surveys
- Update of the science case of PCS: assessment of the detection capability of PCS using Monte Carlo simulations

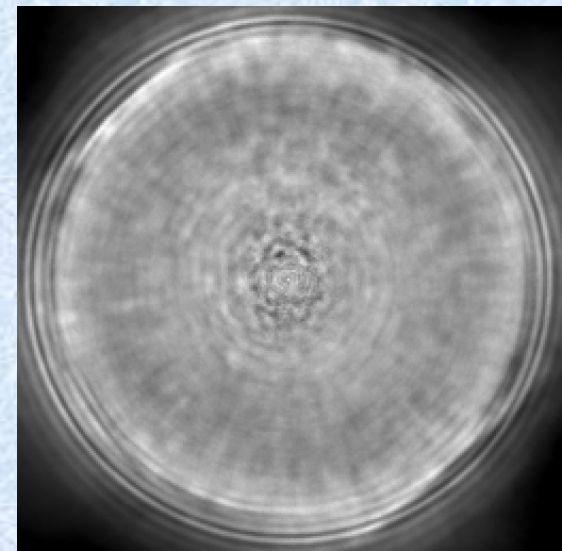
Results from SPHERE commissioning

High contrast imaging

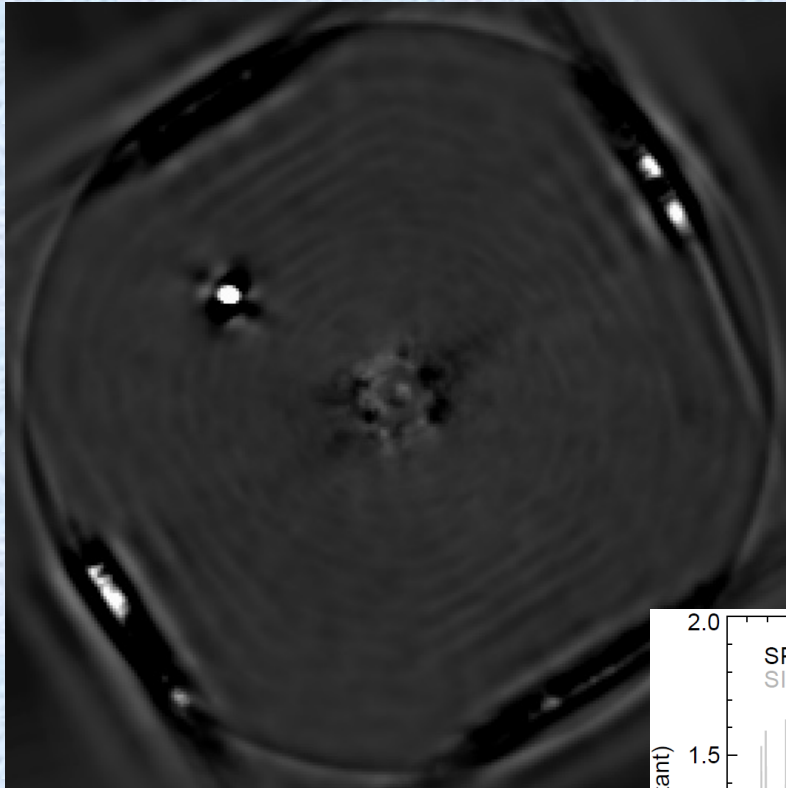
➤ **Best contrast obtained until now with SPHERE**



No planet found for τ Ceti



PZ Tel

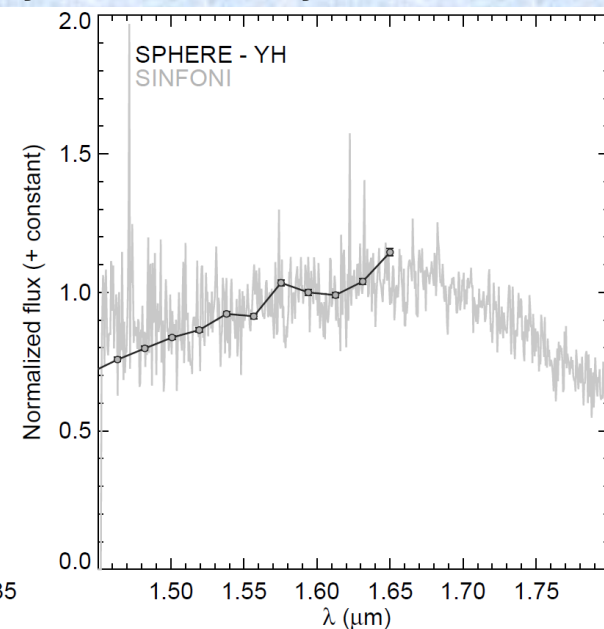
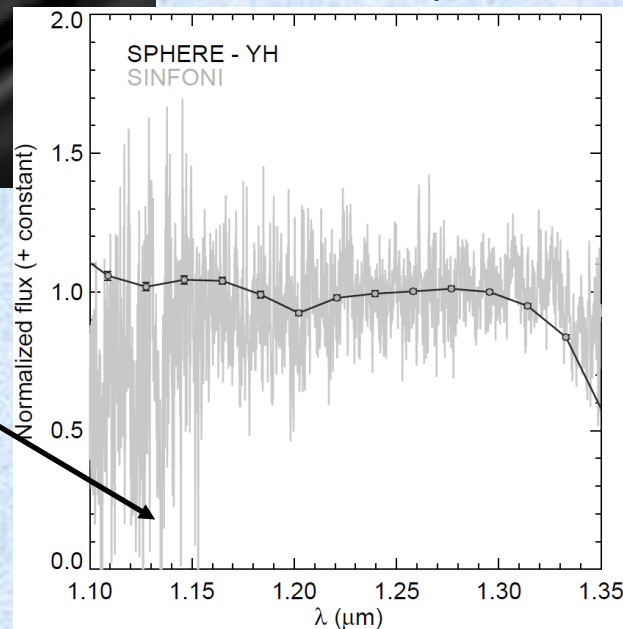


- Known BD companion at a separation of ~ 0.36 arcsec (~ 18.5 AU).

- $\Delta J \sim 5.40$; $\Delta H \sim 5.38$

- Comparison by M. Bonnefoy (IPAG Grenoble)

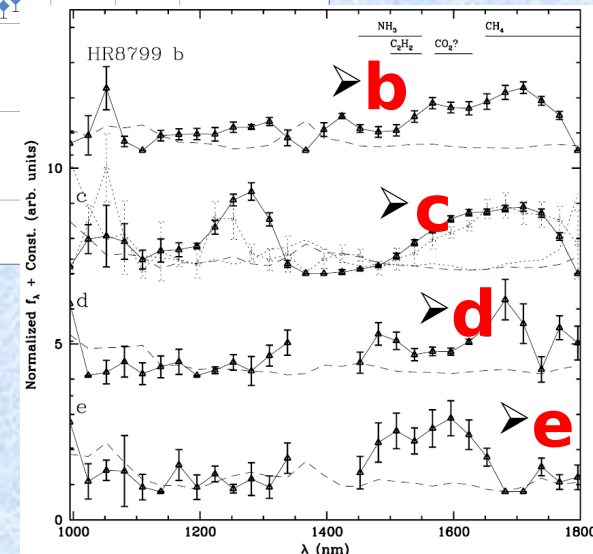
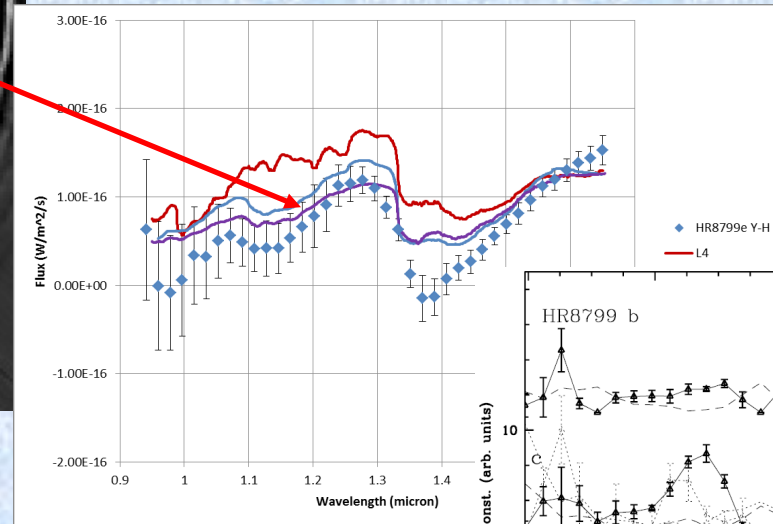
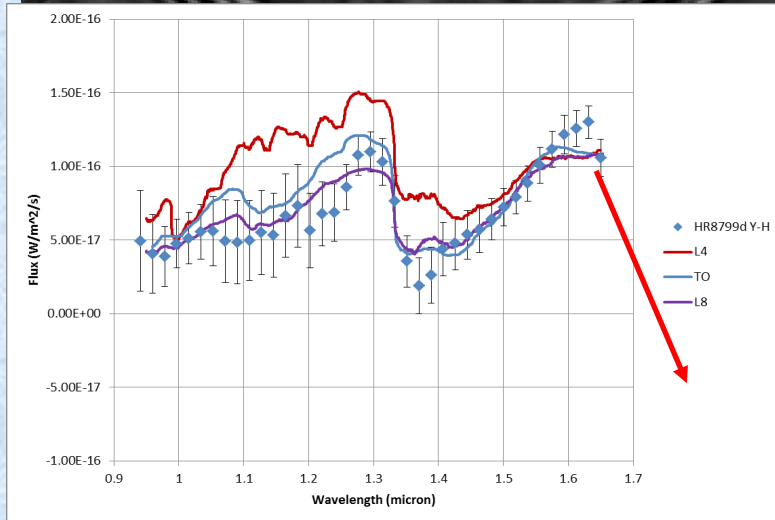
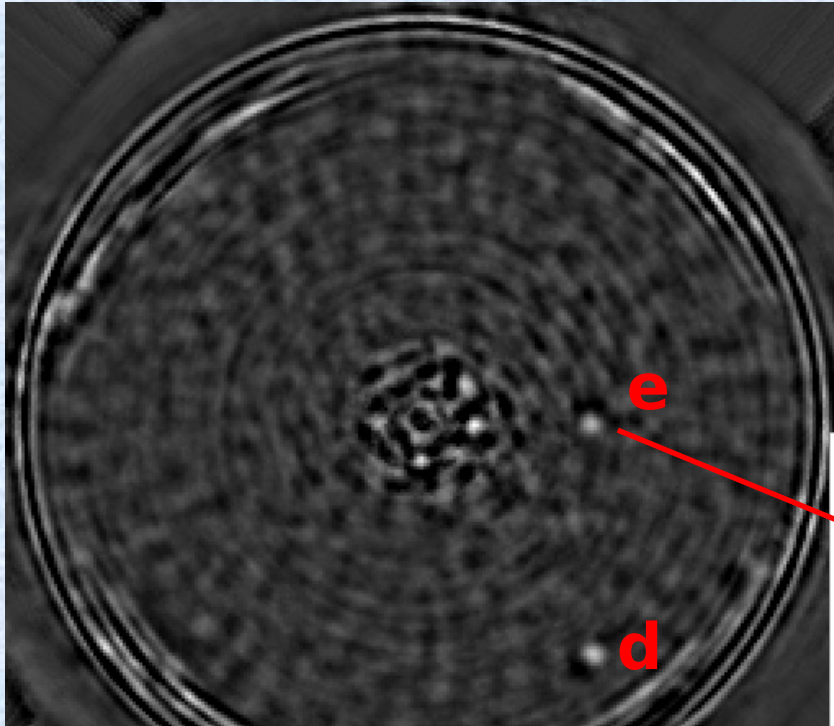
- Low SNR for SINFONI data



HR 8799

HR8799d - Separation ~ 0.61 arcsec
(~ 24 AU); $\Delta J \sim 12.9$, $\Delta H \sim 11.9$

HR8799e - Separation ~ 0.37 arcsec
(~ 14 AU); $\Delta J \sim 12.7$, $\Delta H \sim 11.7$

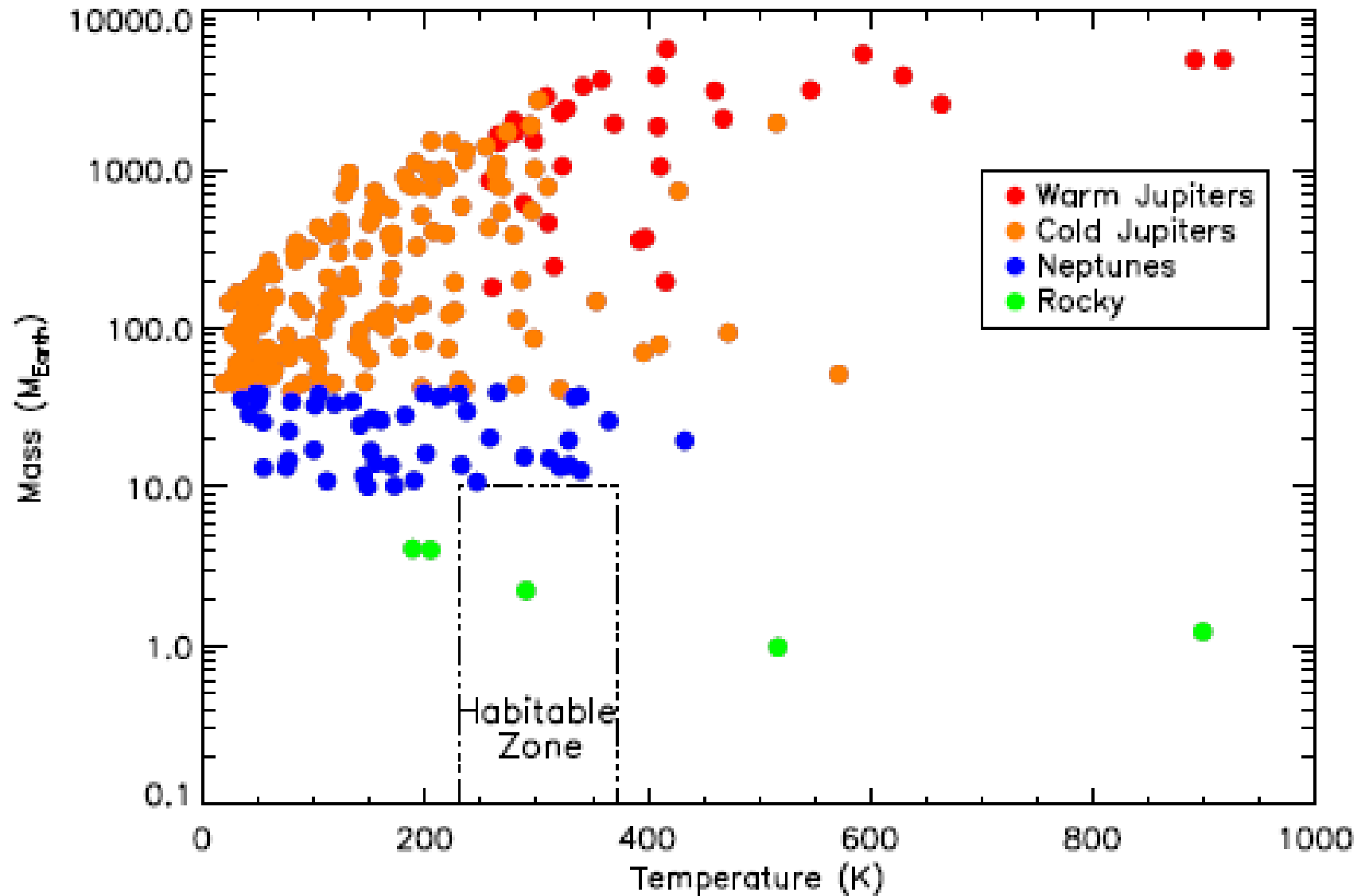


➤ P1640 data
Oppenheimer et al.
2013

Detection capability of PCS using MESS

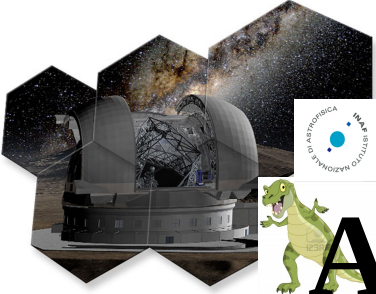
- MESS: Multi-purpose Exoplanet Simulation System - Bonavita et al. 2012
- compares expected properties of a population of exoplanets with detection limits for different instruments, using various techniques (imaging, RV, astrometry, transits)
- Papers at:
 - Exoplanets with the E-ELT (Feb. 2014, Garching)
 - Exoplanets, Biosignatures and Instruments (March 2014 Tucson)

Planets detectable with E-ELT PCS



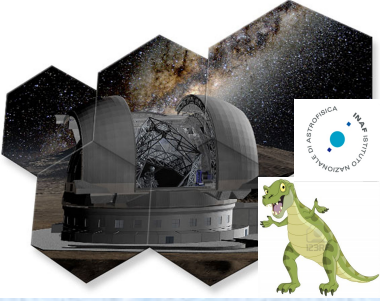
Planets expect to be discovered in the next 15 years with foreseen imagers

	Year	Young Giants	Reflected light planets			
			Giants	Neptunes	Rocky	Habitable
Ground Based 8m	2013	tens	few			
JWST	2018	tens	few			
1.5m Space Coronagraphs	?	tens	tens	tens	few	??
ELTs	> 2020	hundreds	hundreds	tens	few	??



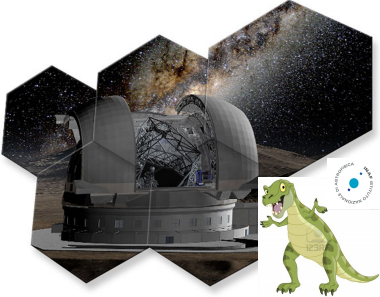
Activity and goals of WP6

- Update of science case (Kepler, RV data, space missions, planet multiplicity, planet atmospheres)
- Detailed study of target sample (A-stars, nearby M-stars)
- Science as a function of updated performance evaluation (FoV, IWA)
- Merits of speckle calibration methods (speckle deconvolution, ADI, PCA) using SPHERE data
- Impact of PCS design upgrades



Activity and goals of WP6

- Revision of lenslet design based on SPHERE (pupil apodization)
- Re-evaluation of slicer option (prototyping to be done in second year) □ collaboration with Oxford
- Choices to be discussed in both schemes:
 - Cryo (thermal background)
 - FoV
 - Dithering
 - High resolution mode
- Updated comparison between lenslet and slicer options



Thank you

