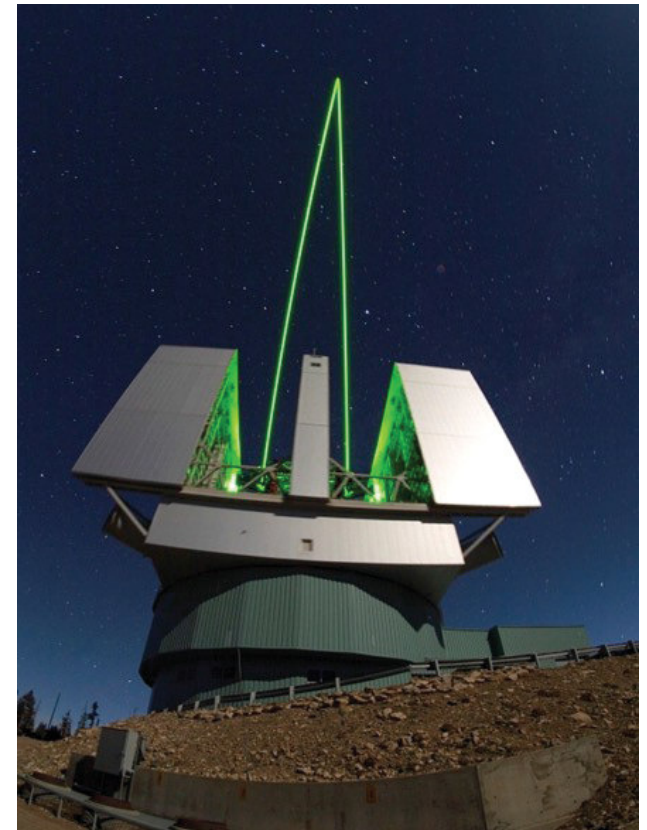


What makes **ARGOS** unique?

Nadine Neumayer





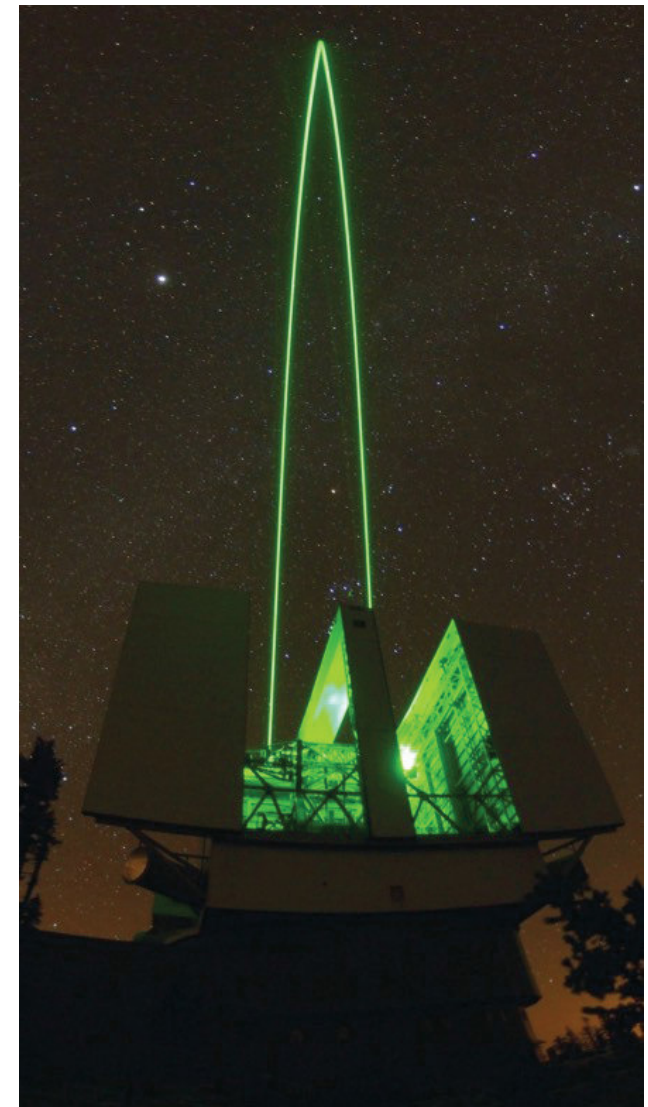
ARGOS

Advanced Rayleigh Ground layer adaptive Optics System



Software, Calibration Unit,
Vibration Compensation System

- Inst.: **Wolfgang Gässler**, Diethard Peter
- Konst.: (Th. Blümchen), Monika Ebert, Norbert Münch,
Ralf-Rainer Rohloff
- FWT: Armin Böhm, Klaus Meixner, ++
- SW: José Borelli, Martin Kulas, ++
- Elect.: Michael Lehmitz, Lars Mohr, ++
- Science: Iskren Georgiev, Nadine Neumayer, ++



ARGOS Consortium



AIP



- PI - Max Planck Institut für extraterrestrische Physik, Garching
- CoPI - Osservatorio Astrofisico di Arcetri, Florence
- **CoPI - Max Planck Institut für Astronomie, Heidelberg**
- CoPI - Center for Astronomical Adaptive Optics, Tucson
- Astrophysikalisches Institut, Potsdam
- Landessternwarte, Heidelberg
- Large Binocular Telescope Observatory, Tucson
- Max Planck Institut für Radioastronomie, Bonn
- Max Planck Institut Semiconductor Laboratory, Munich



The strength of ARGOS

- Ground layer adaptive optics correction over a very large field of view 4'x4'
- Image quality improves by factor 2-3
 - > typical PSF FWHM 0.2"-0.3" in K-band
 - > reduces integration times by factor 4-9
 - > demanding observations can be done during more nights
- Using all modes of LUCI
 - imaging / long-slit spectroscopy / multi-object spectroscopy



Predicted correction of PSF

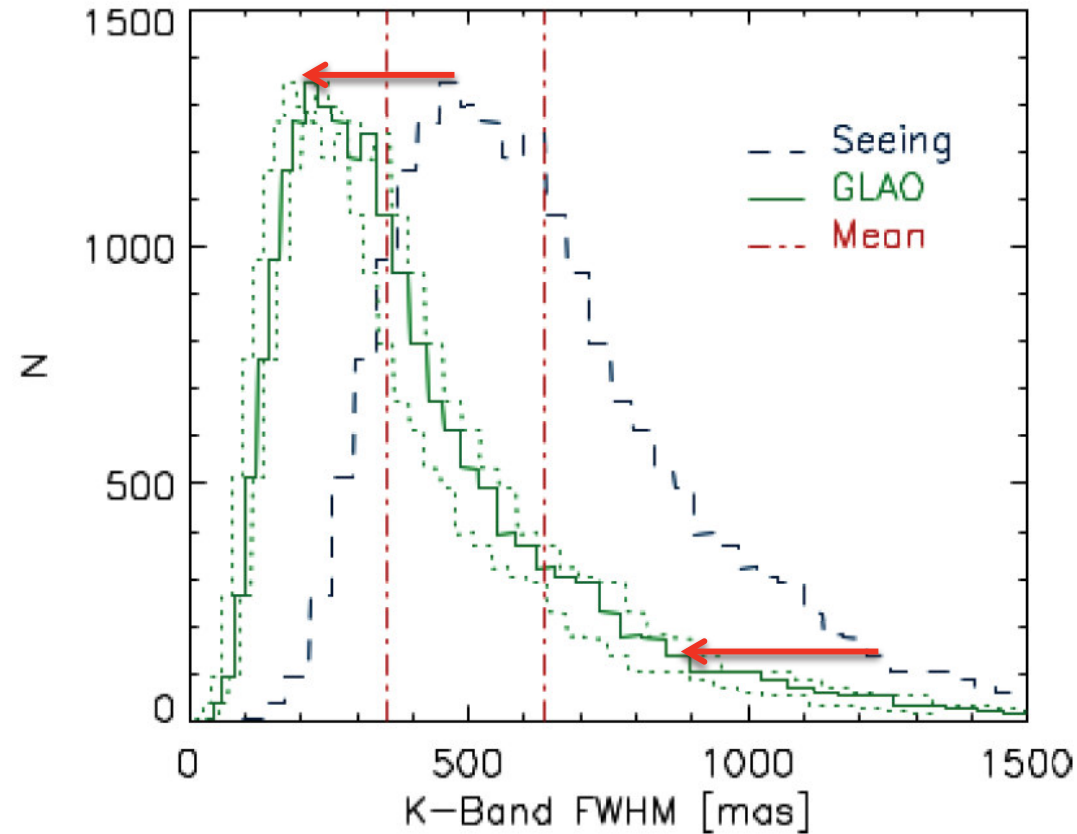
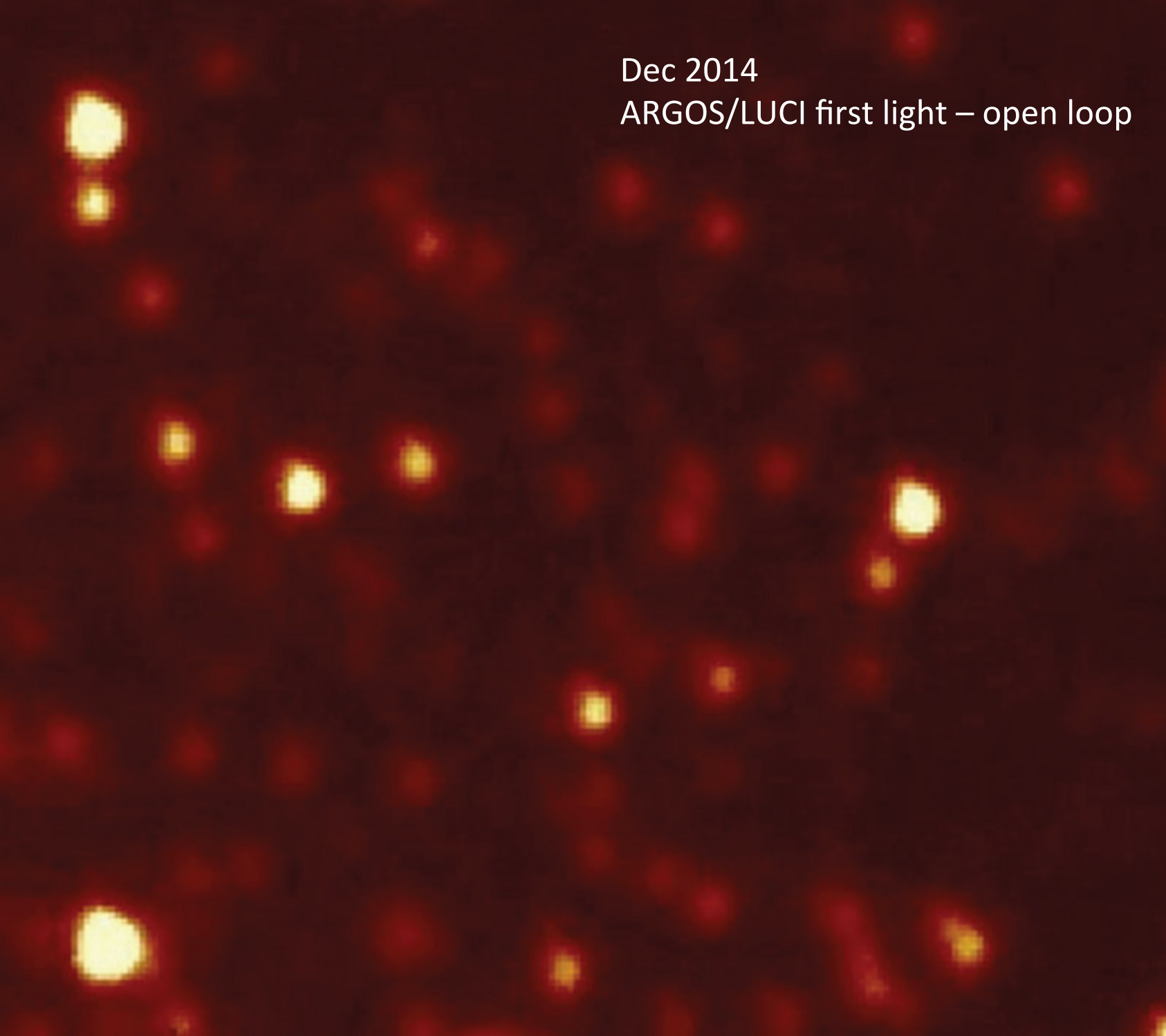


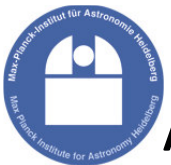
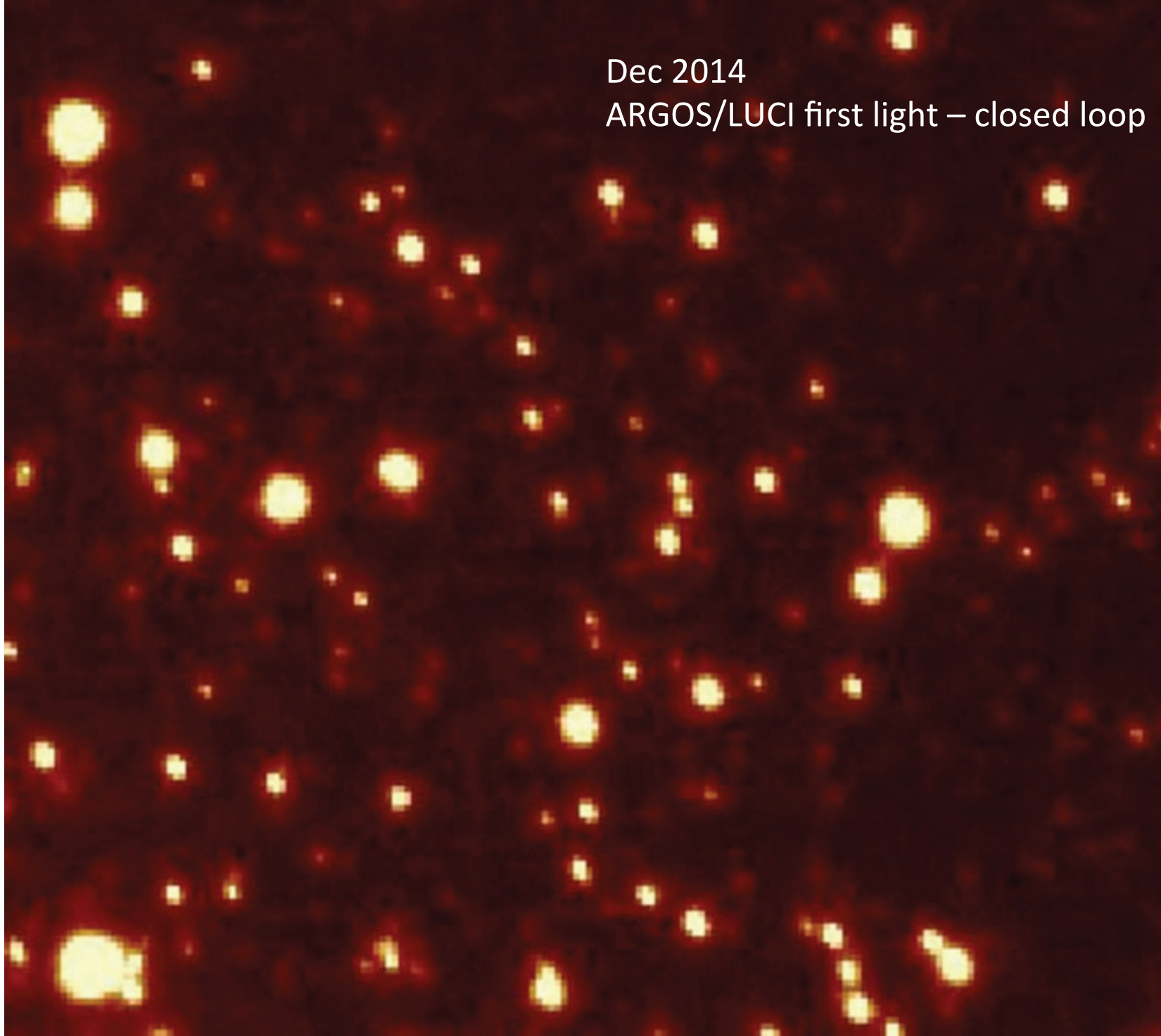
Figure 1 Predicted reduction of the PSF size in the K-band to a seeing statistics as derived at the MMT in Arizona. The mean of the distribution before 0.63" and after GLAO, 0.34", correction are indicated in red. This is consistent with the median seeing observed at LBT including dome seeing of 0.75-0.8 FWHM in visible band.



Dec 2014
ARGOS/LUCI first light – open loop



Dec 2014
ARGOS/LUCI first light – closed loop





commissioning results

2015/2016



NGC 2419

filter - Texp

J - 81s

H - 117s

Ks - 195s

total time

incl. overheads

~ 30min

Dec 2015

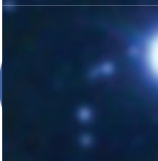


NGC2419

(2015/12/19)

0.7" seeing LBT / LUCI1

JHKs



NGC2419

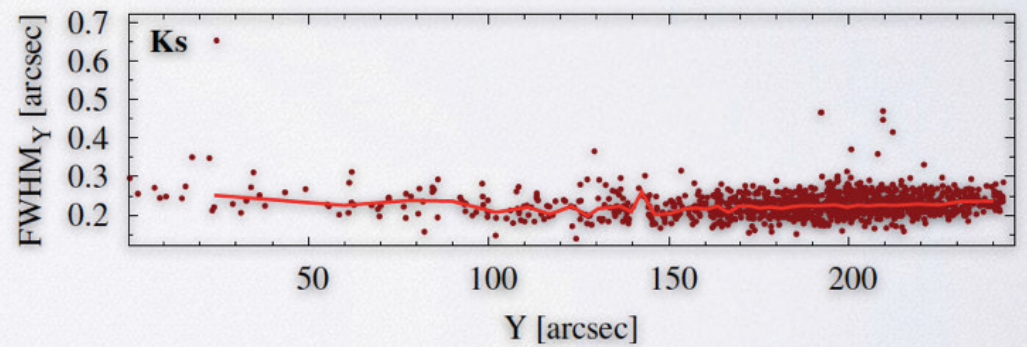
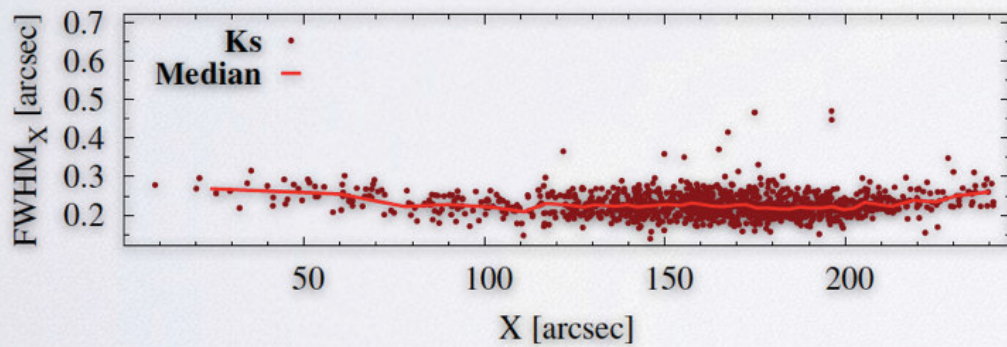
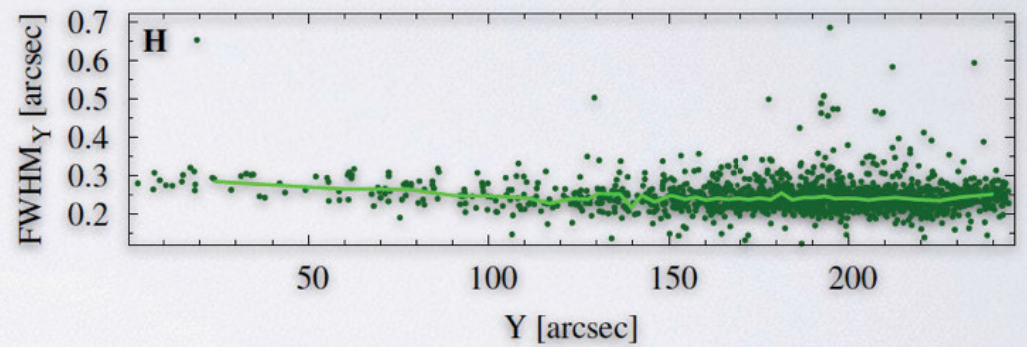
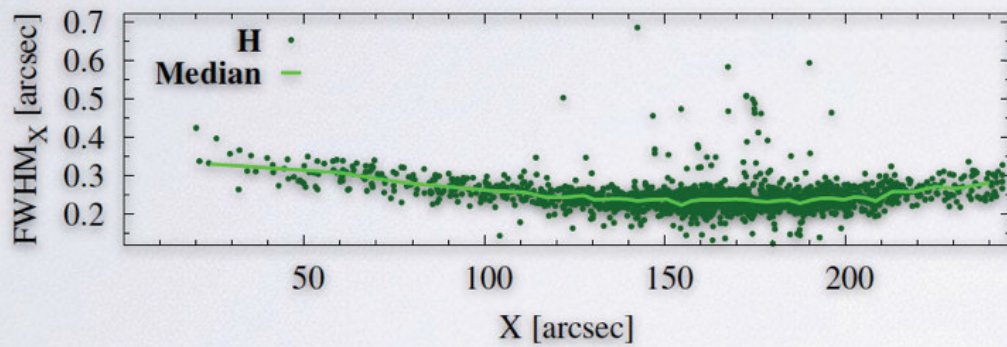
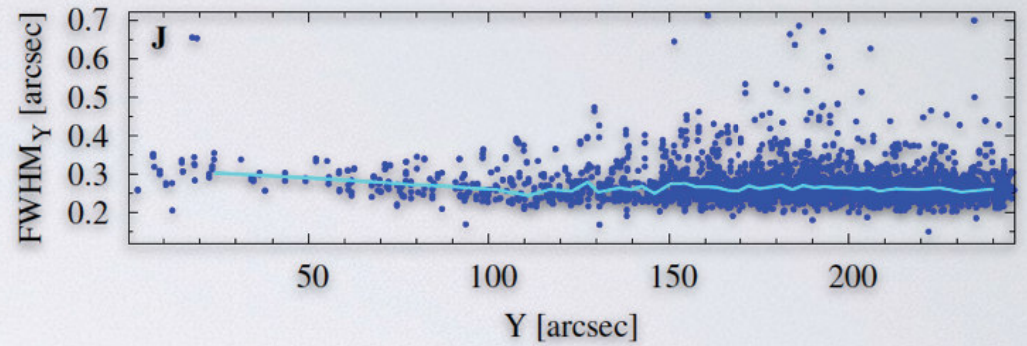
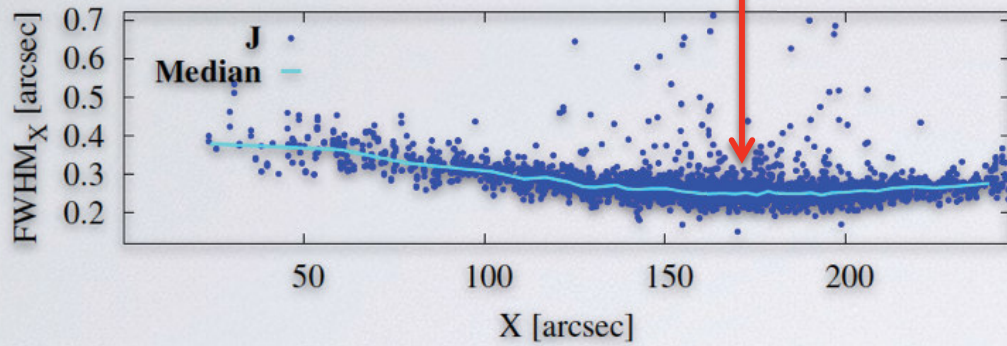
(2015/12/19)

LBT / ARGOS & LUCI1

JHKs



Position of the tip-tilt star



NGC 2419

filter - Texp

J - 81s

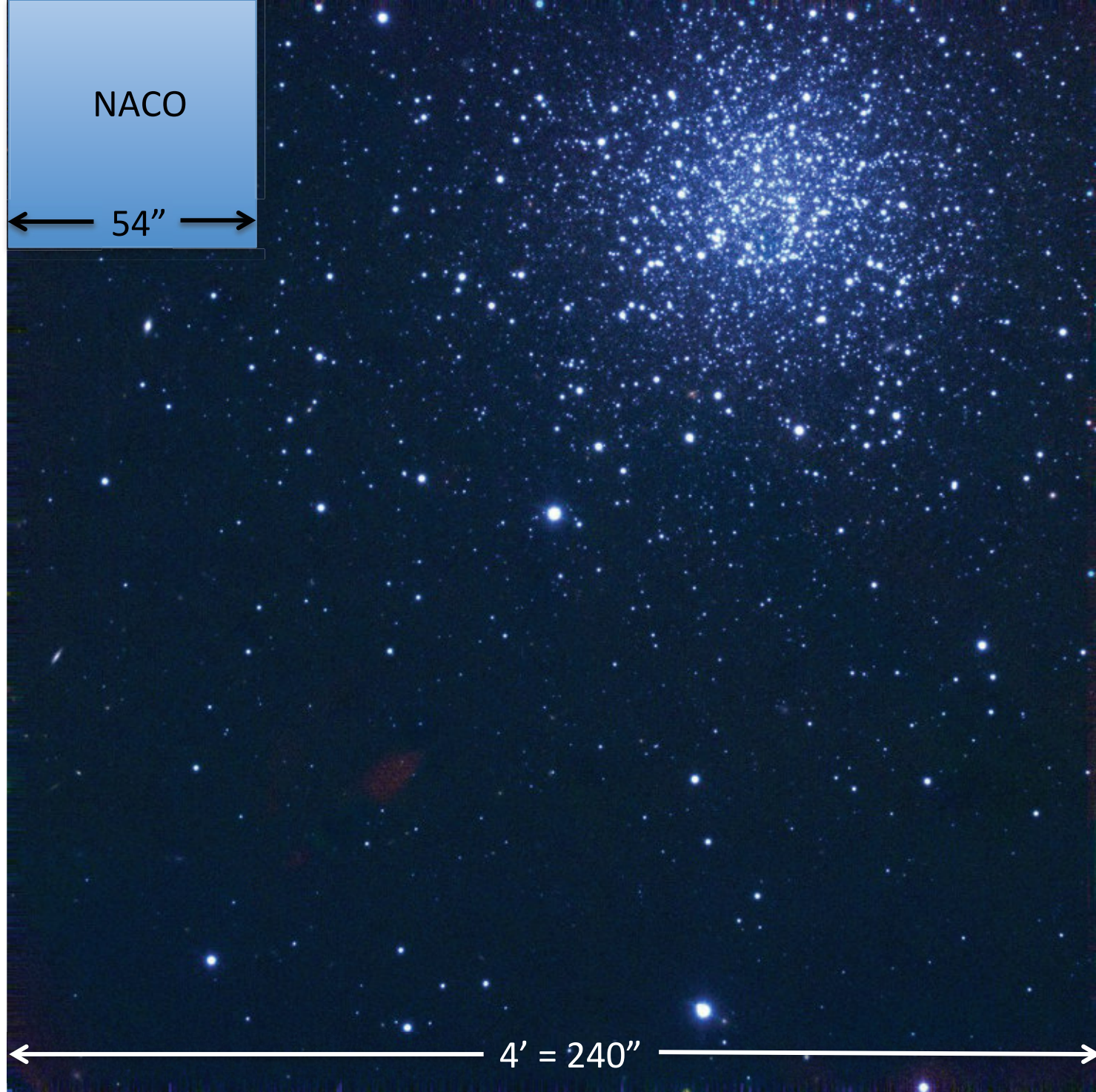
H - 117s

Ks - 195s

total time

incl. overheads

~ 30min



NGC 2419

filter - Texp

J - 81s

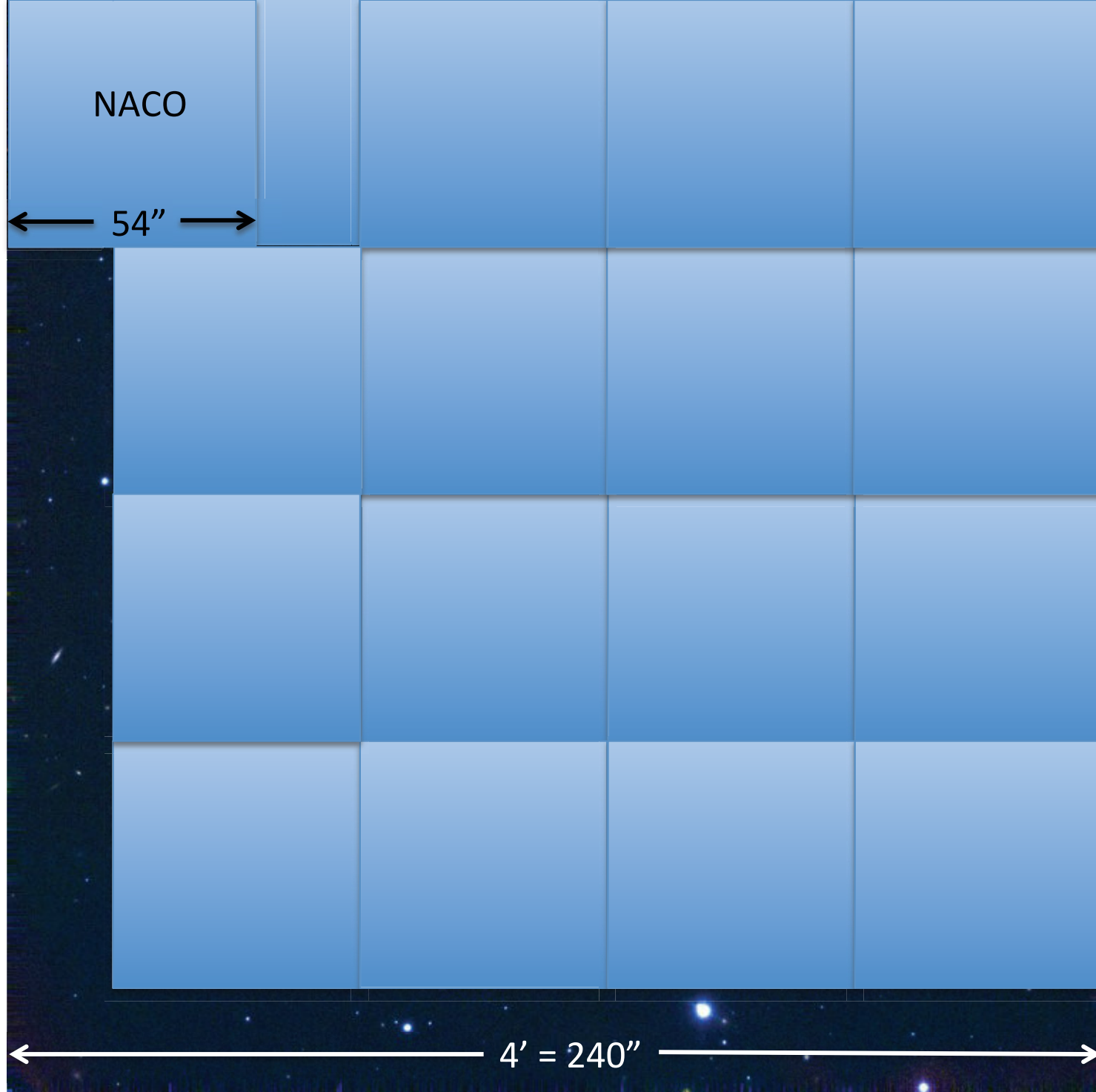
H - 117s

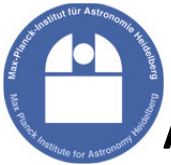
Ks - 195s

total time

incl. overheads

~ 30min





Astro

Neumayer

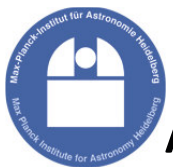


M54 with HST





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen

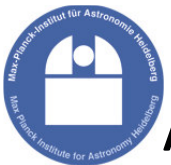


AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen

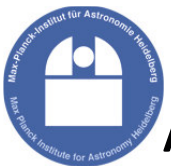


AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen

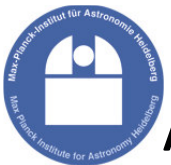


AstroTechTalk - July 1, 2016



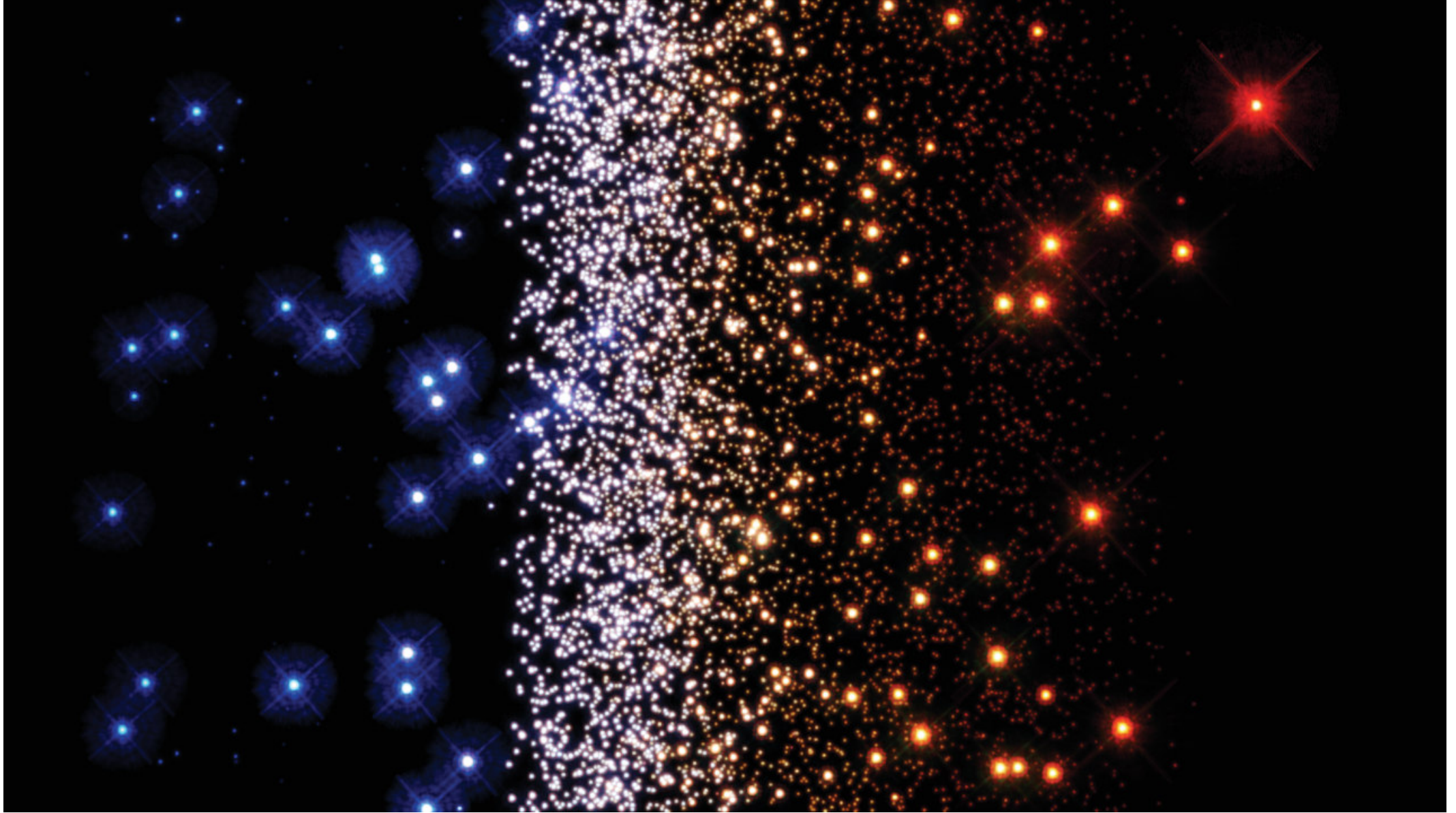


Omega Centauri with WFC3/HST
Jay Andersen

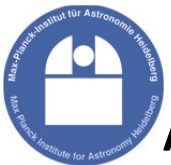


AstroTechTalk - July 1, 2016



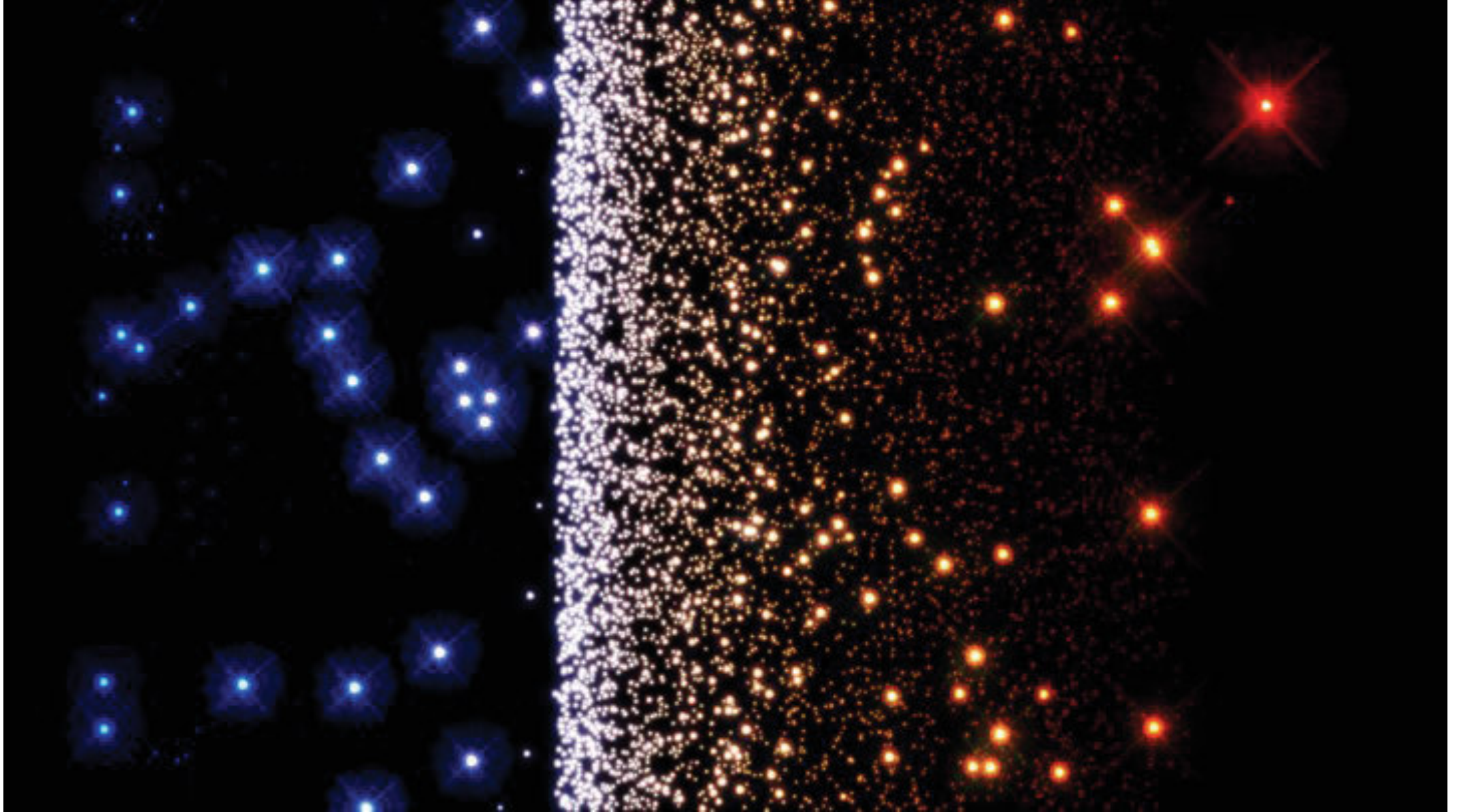


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



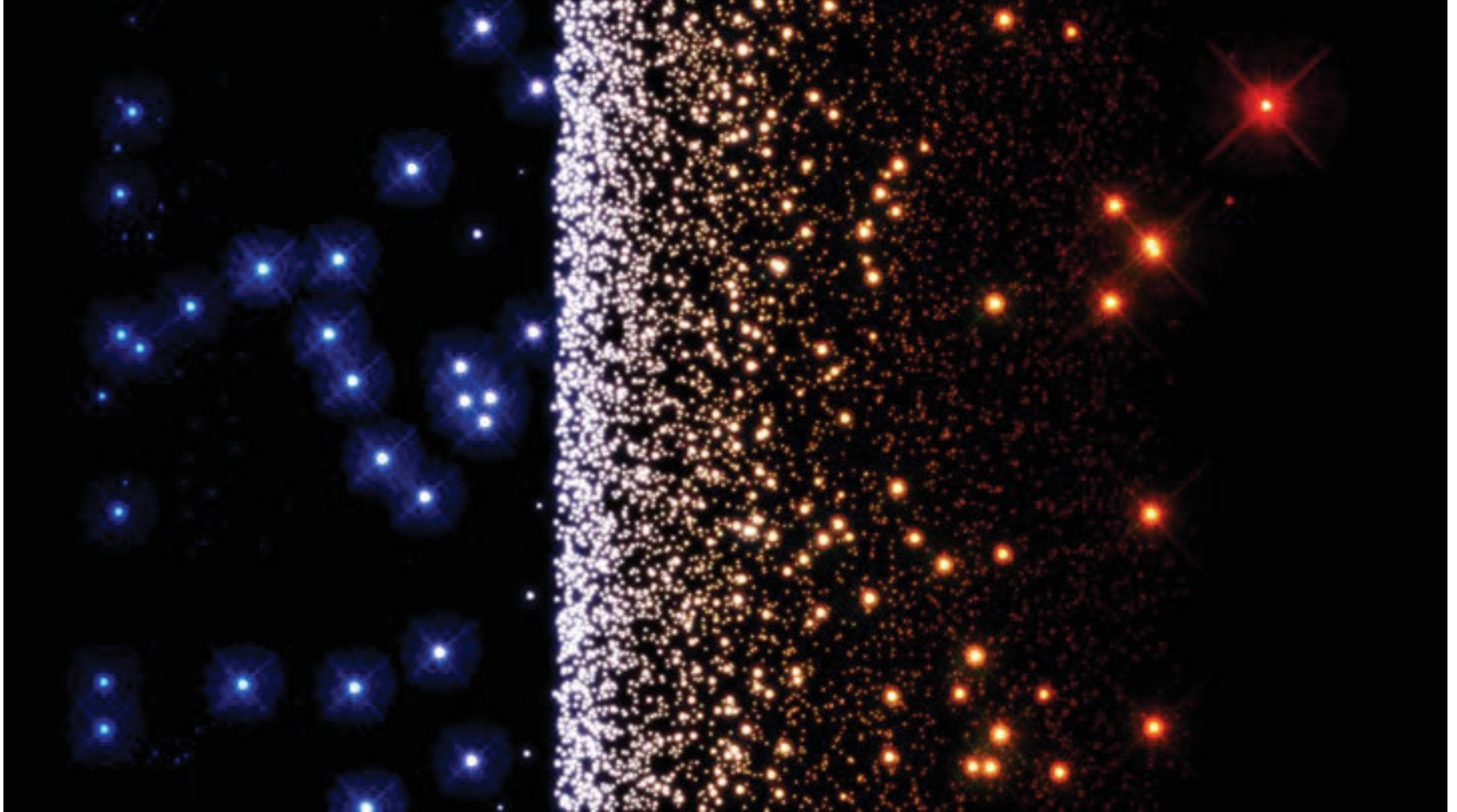


Omega Centauri with WFC3/HST
Jay Andersen

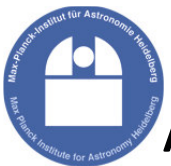


AstroTechTalk - July 1, 2016



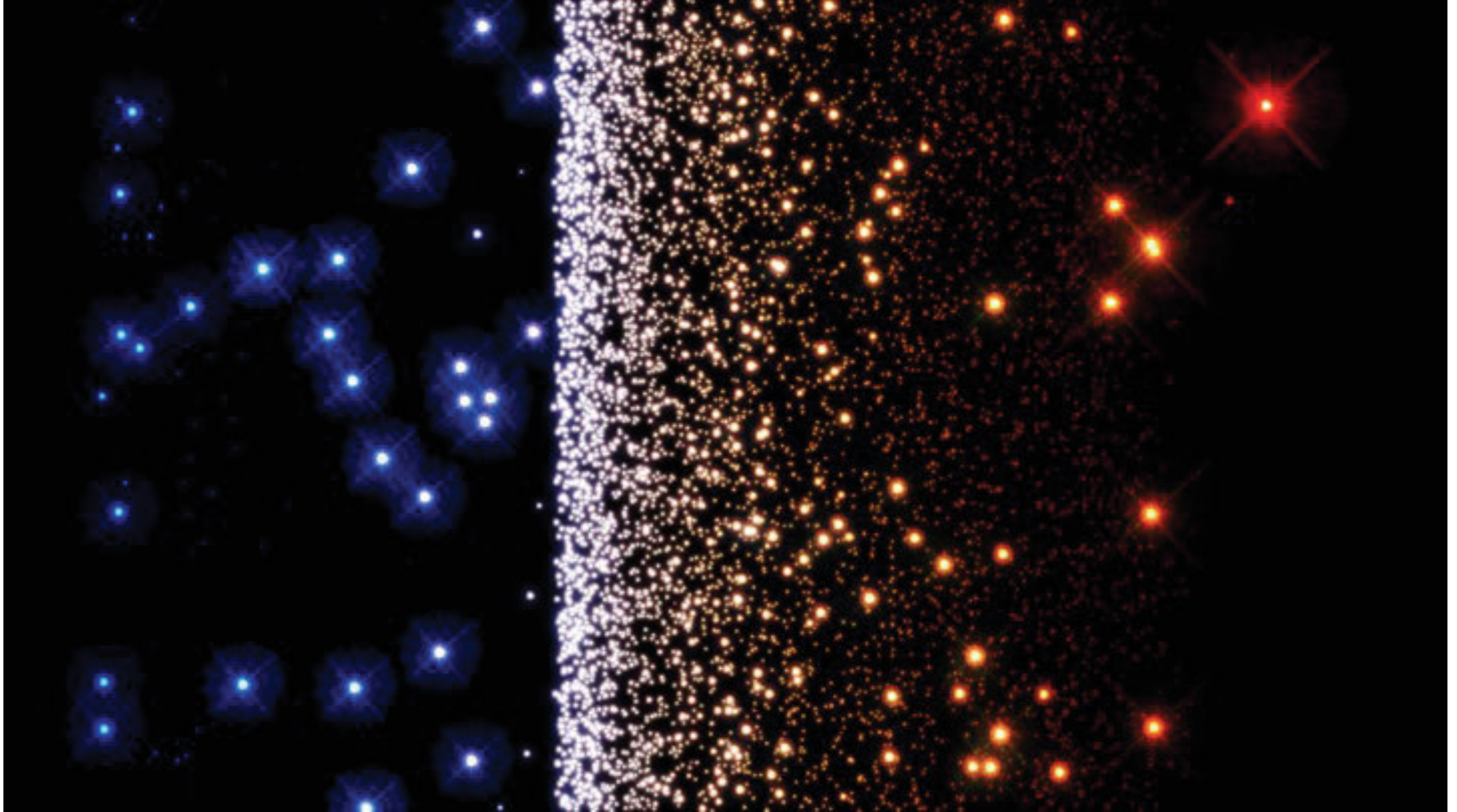


Omega Centauri with WFC3/HST
Jay Andersen

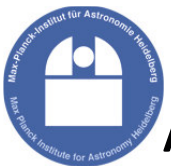


AstroTechTalk - July 1, 2016



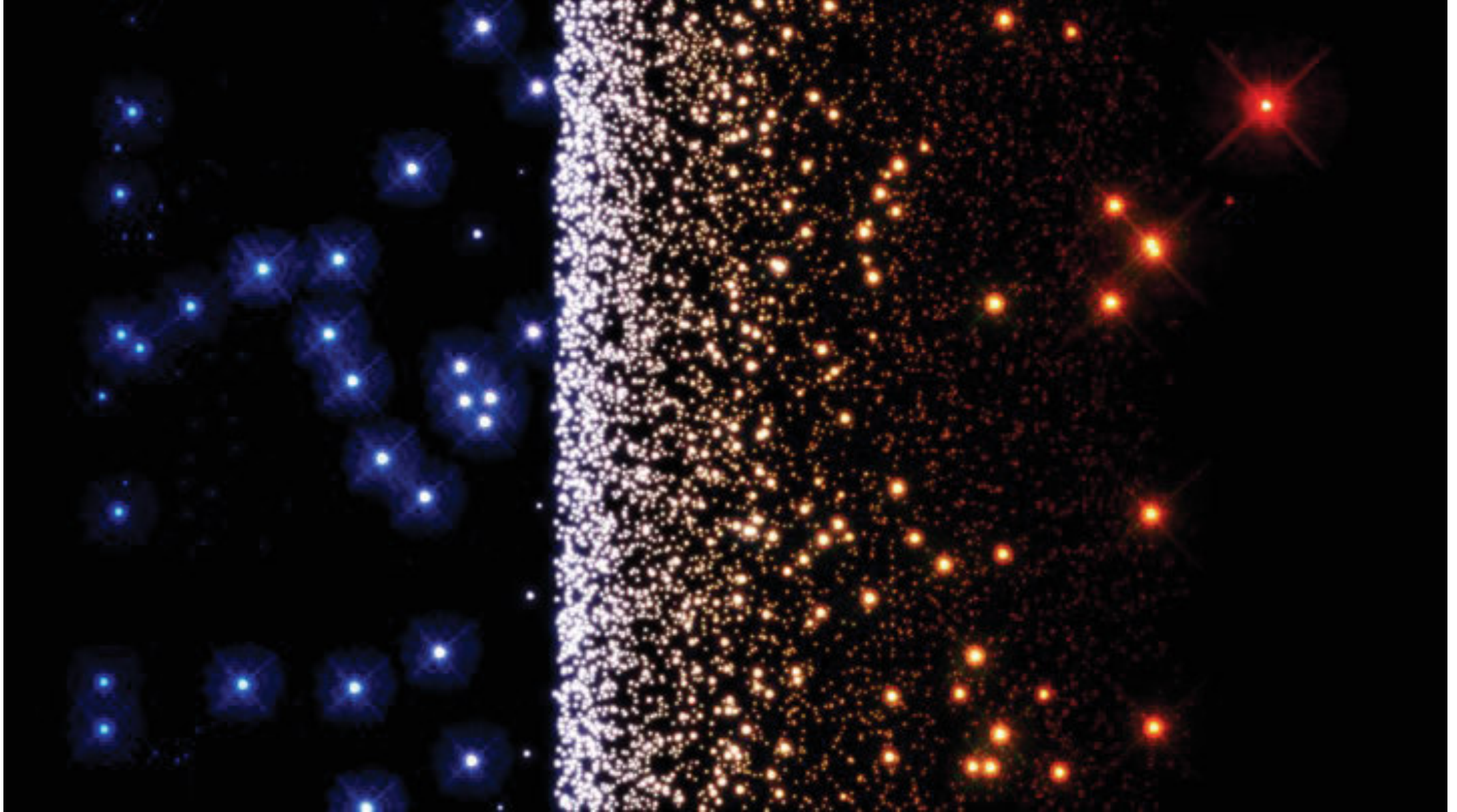


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



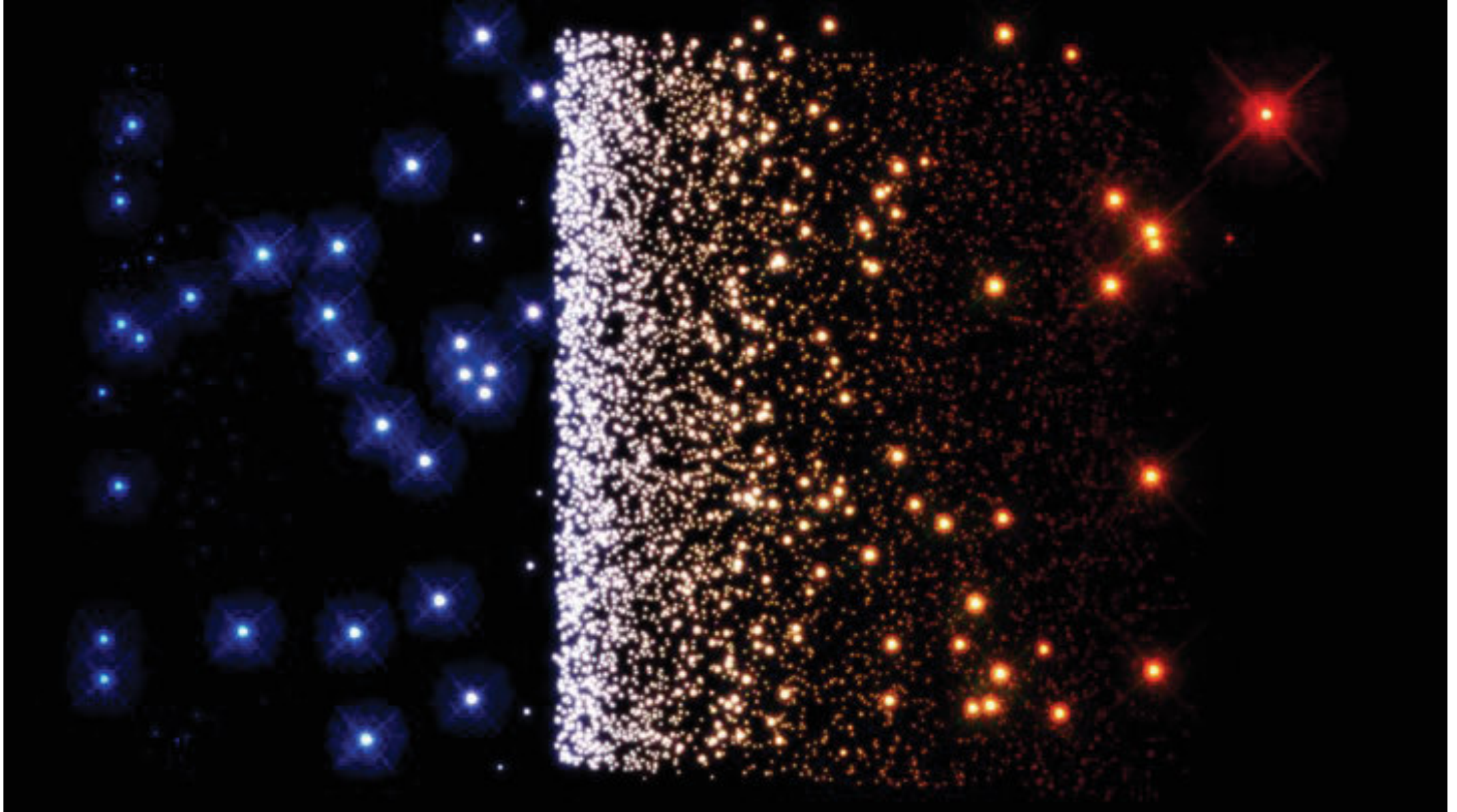


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



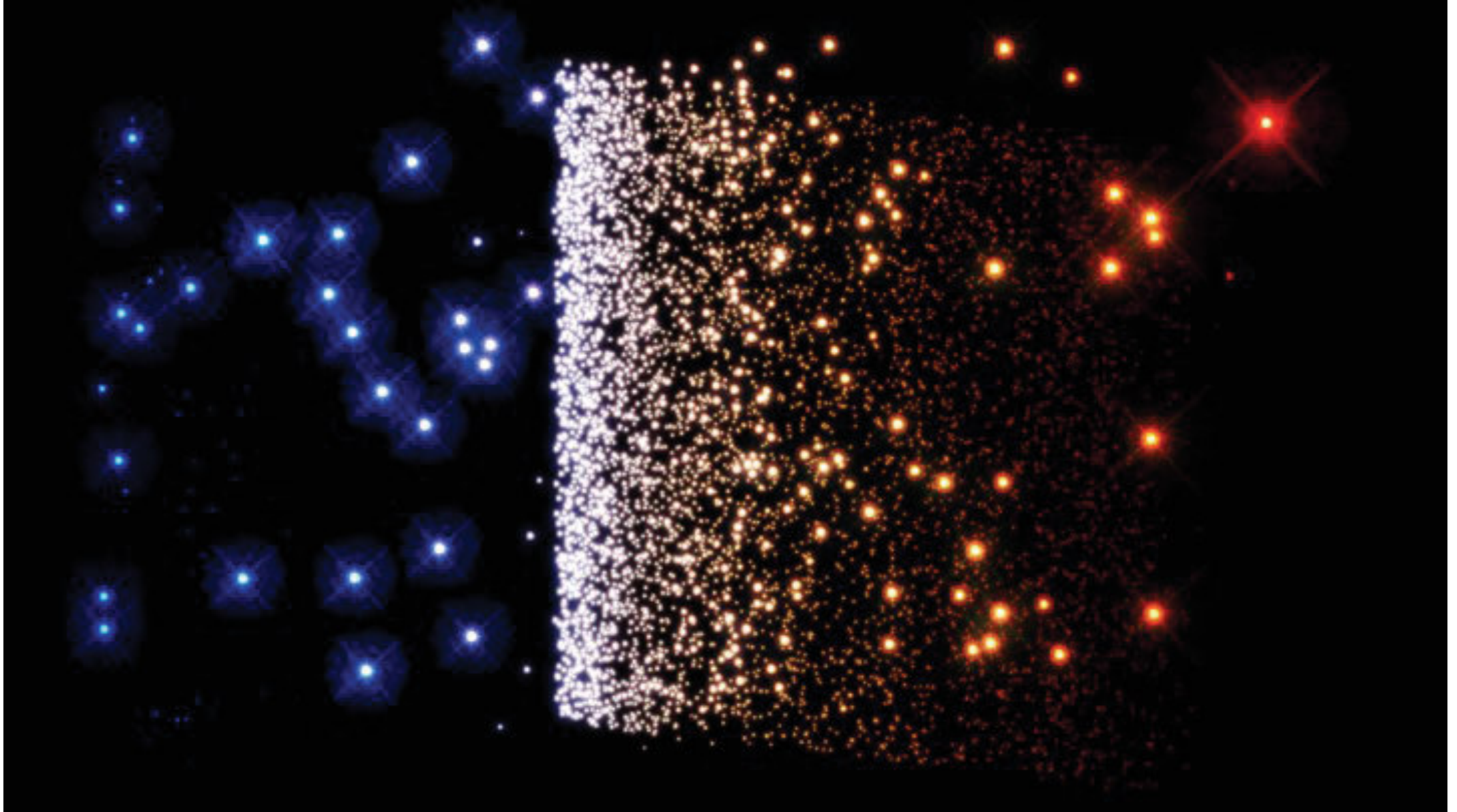


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



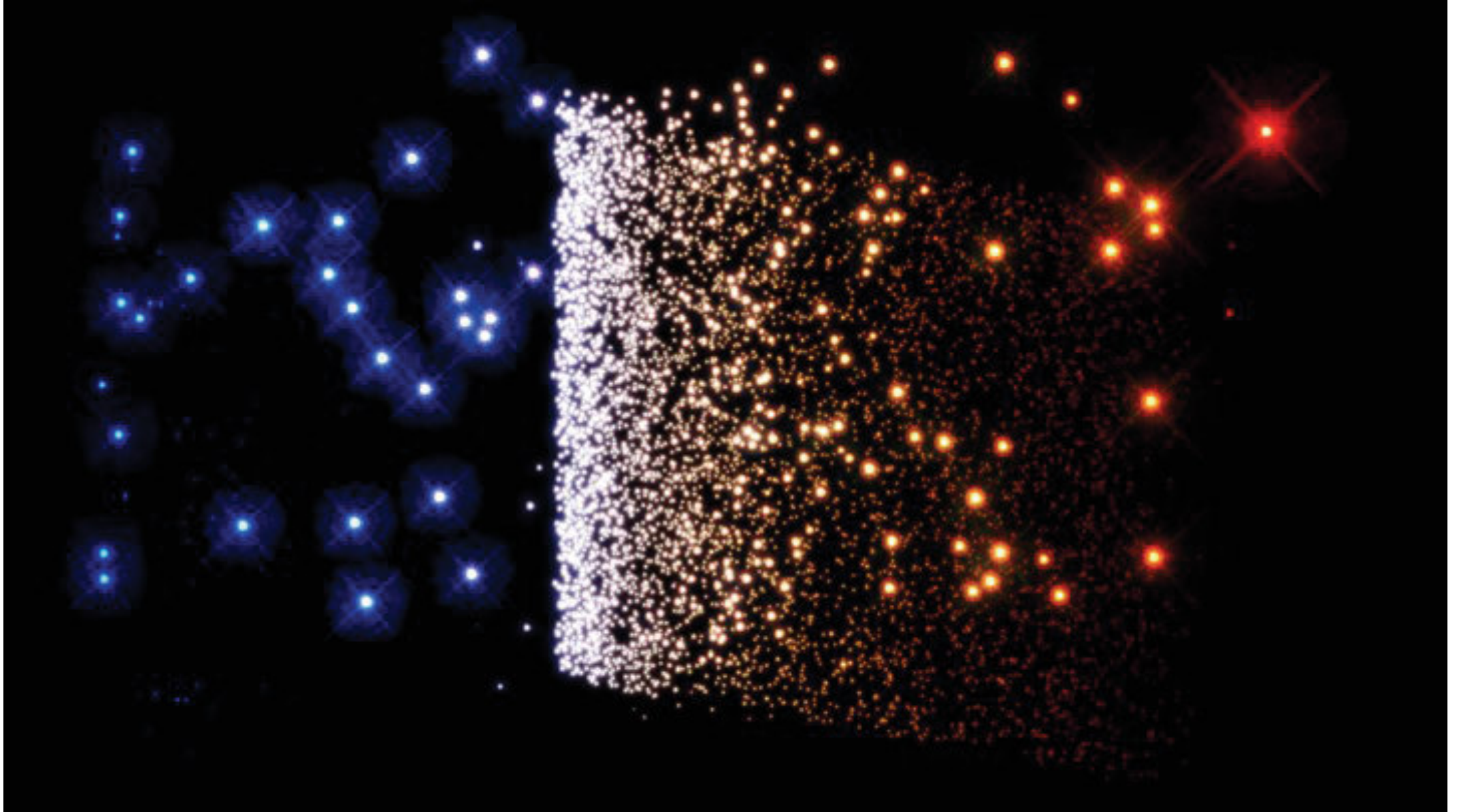


Omega Centauri with WFC3/HST
Jay Andersen

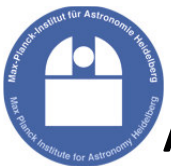


AstroTechTalk - July 1, 2016



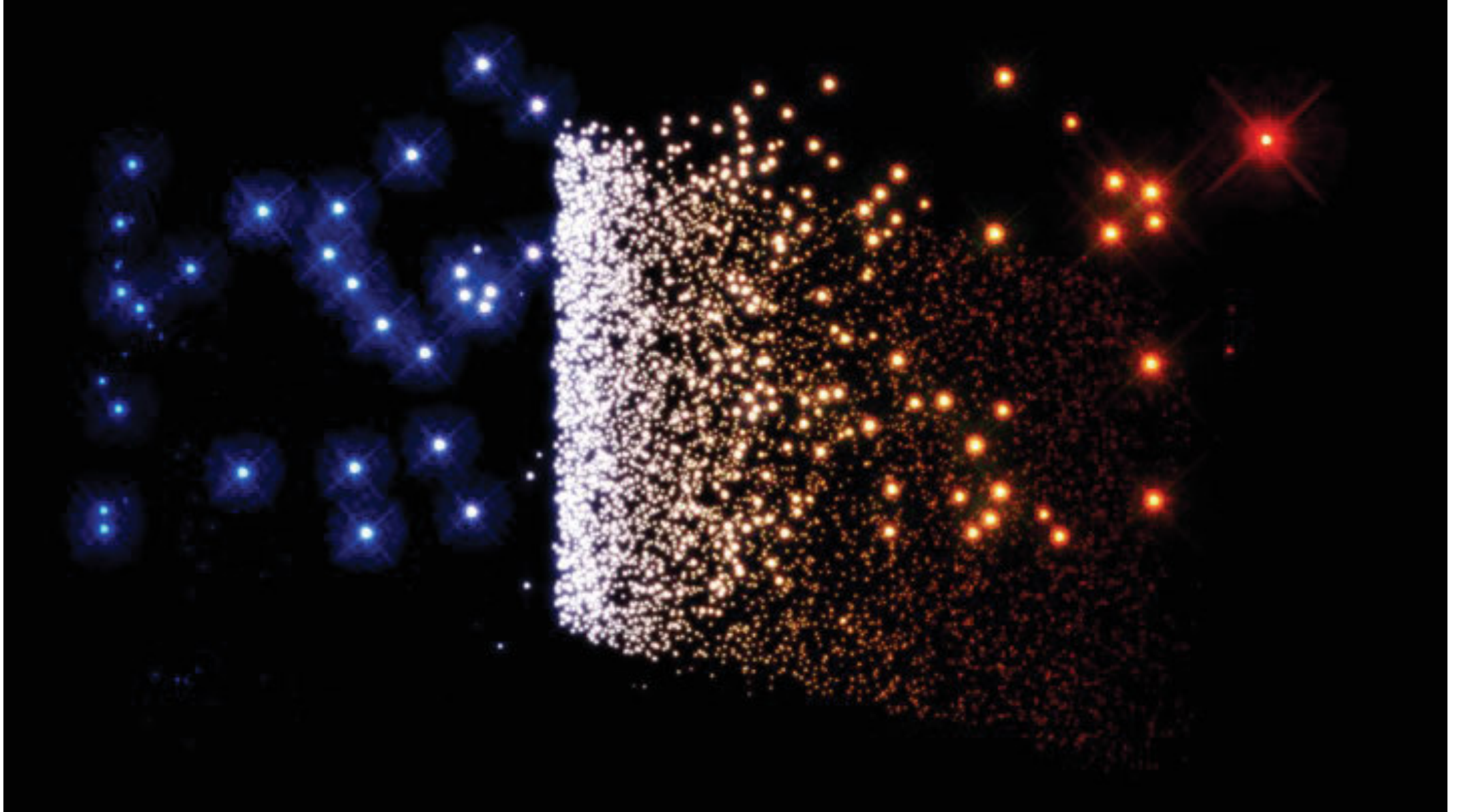


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016

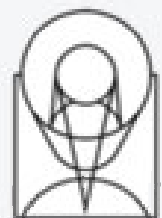


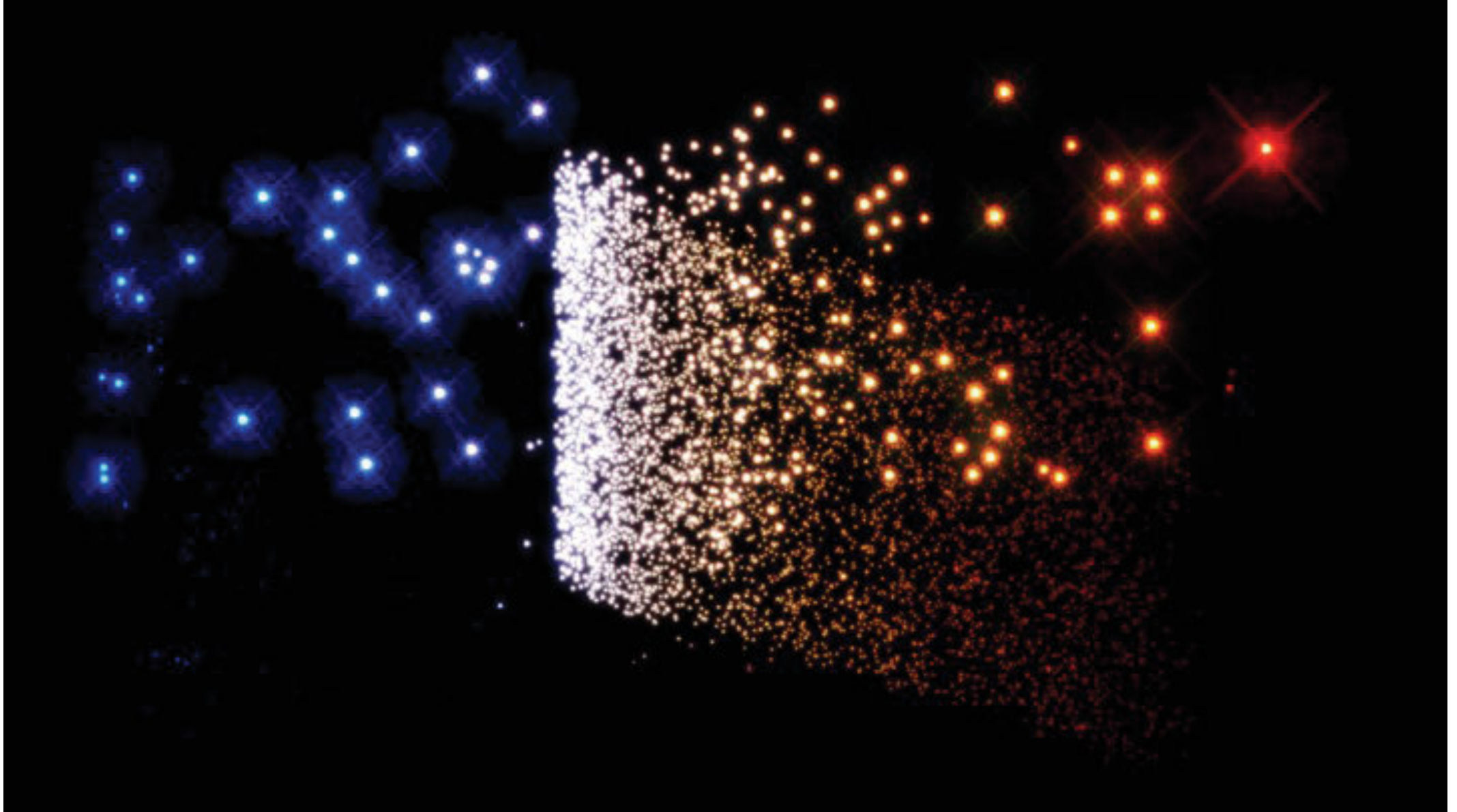


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



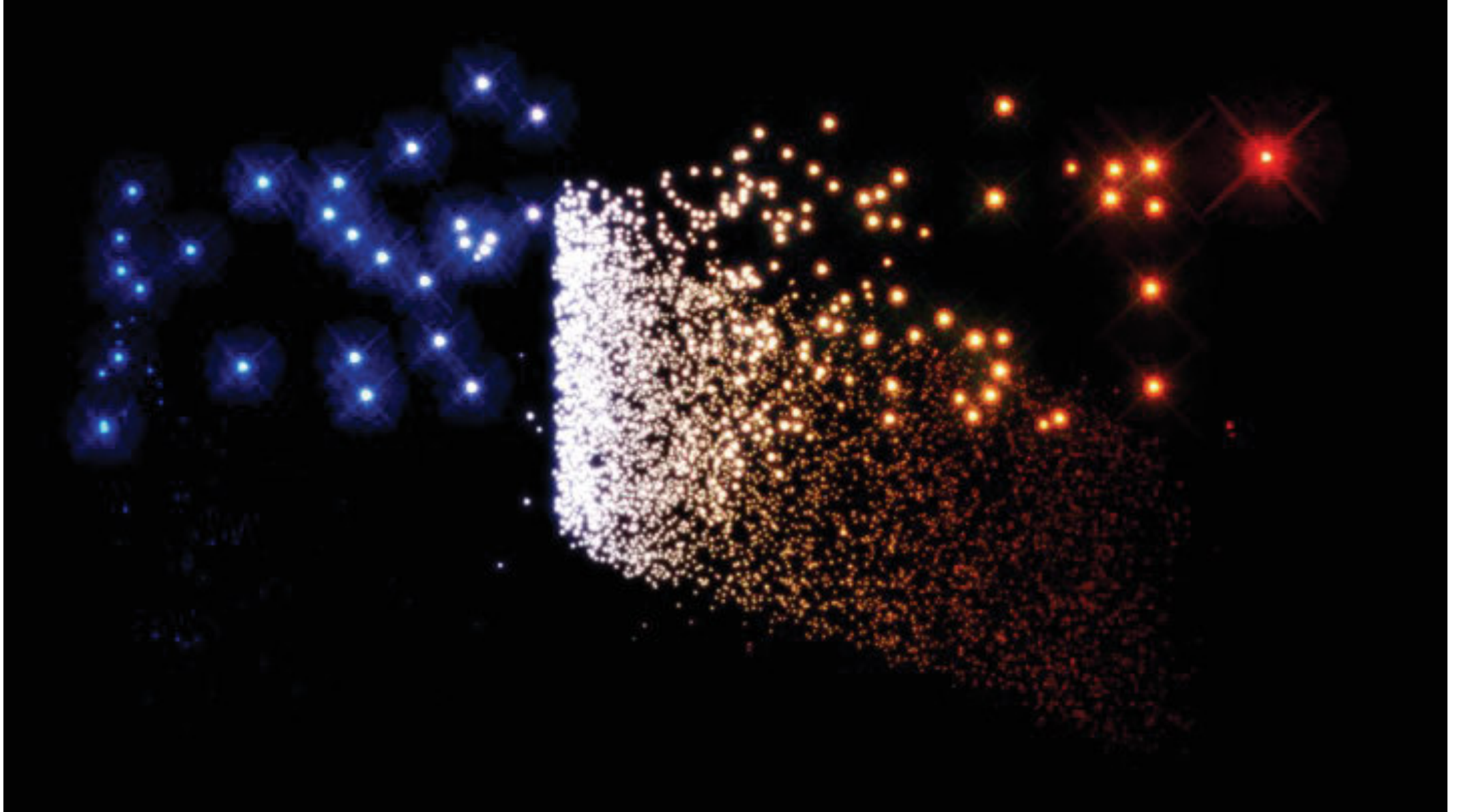


Omega Centauri with WFC3/HST
Jay Andersen

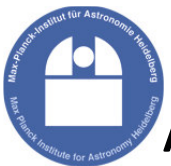


AstroTechTalk - July 1, 2016



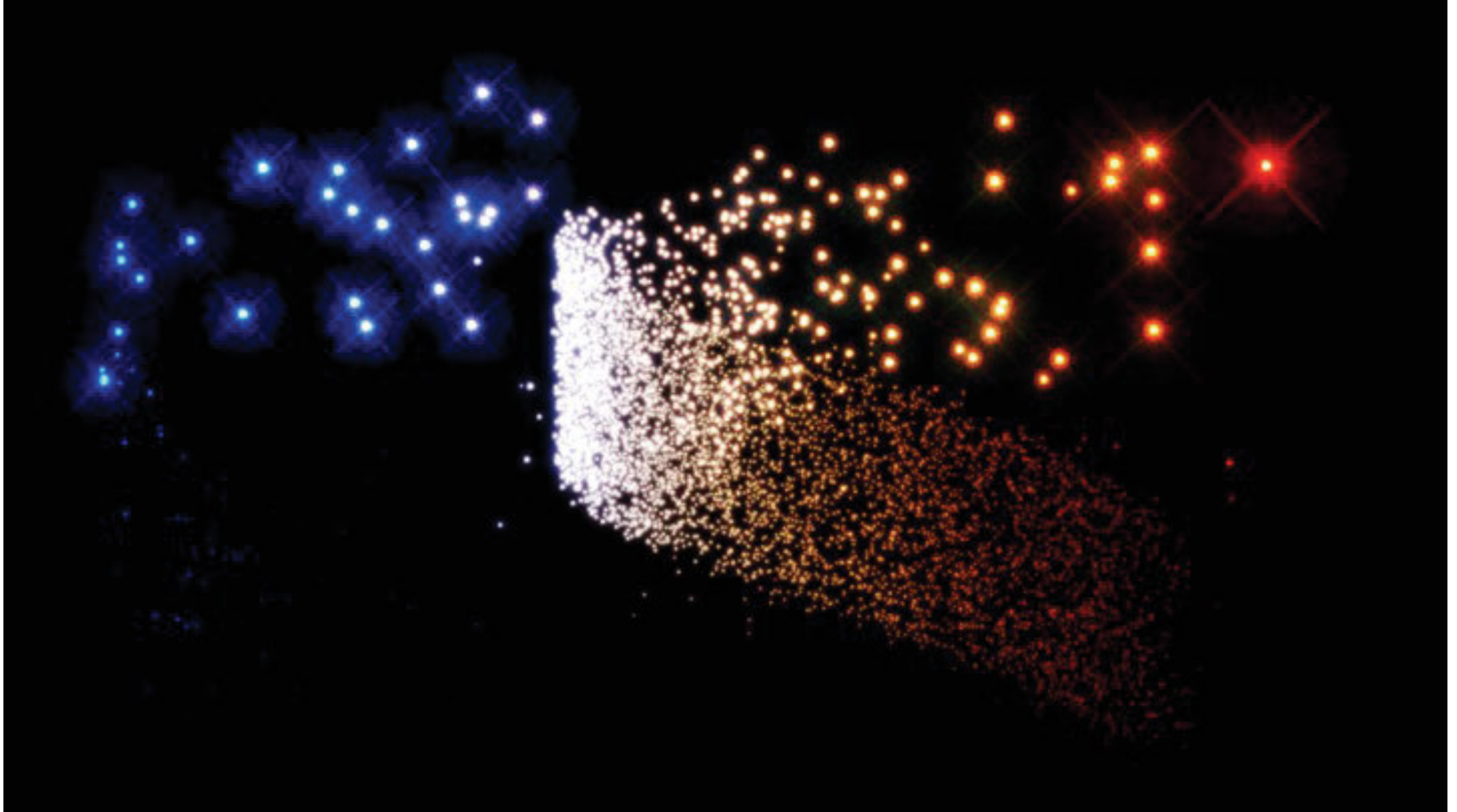


Omega Centauri with WFC3/HST
Jay Andersen

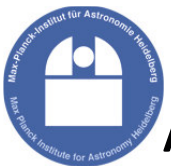


AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



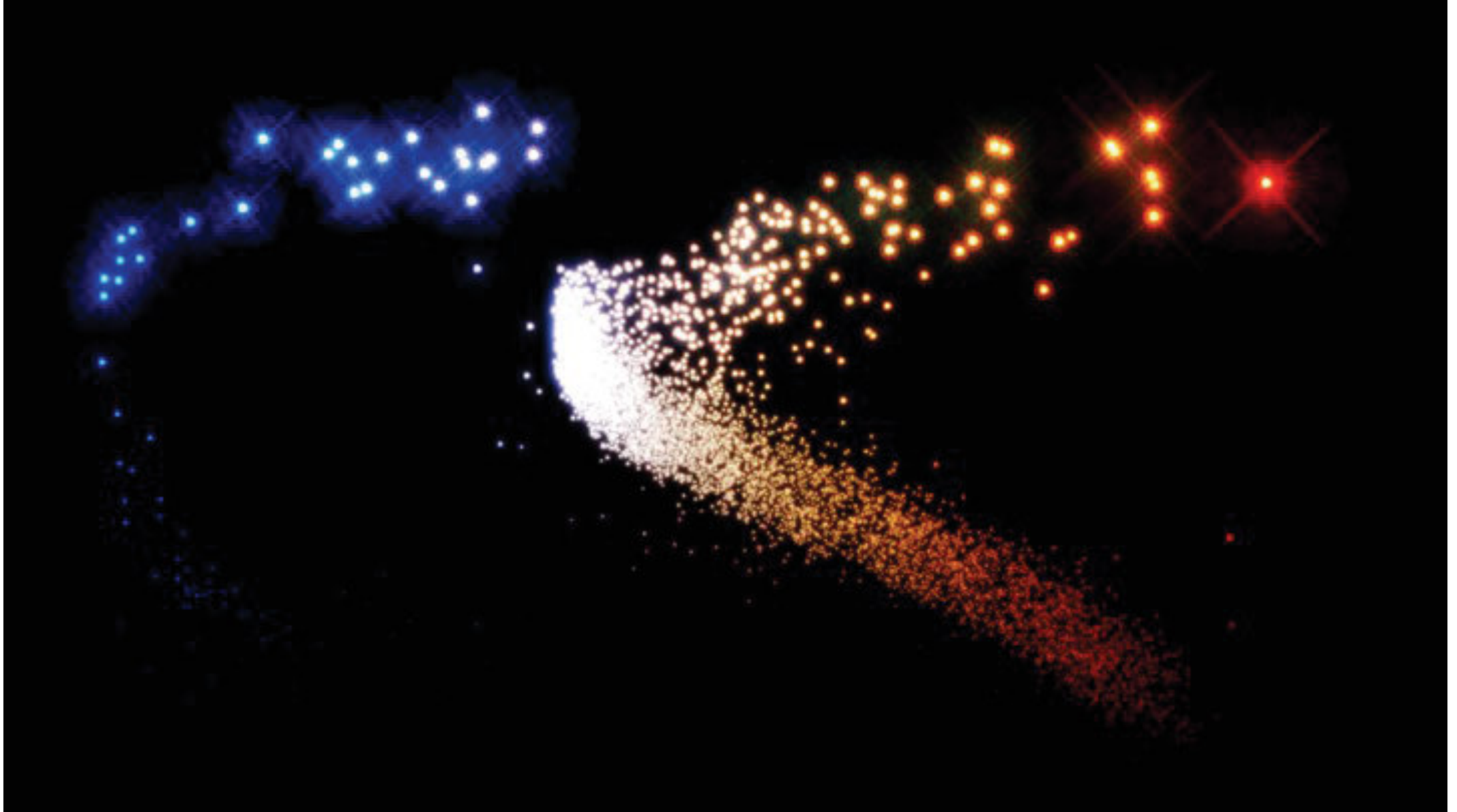


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



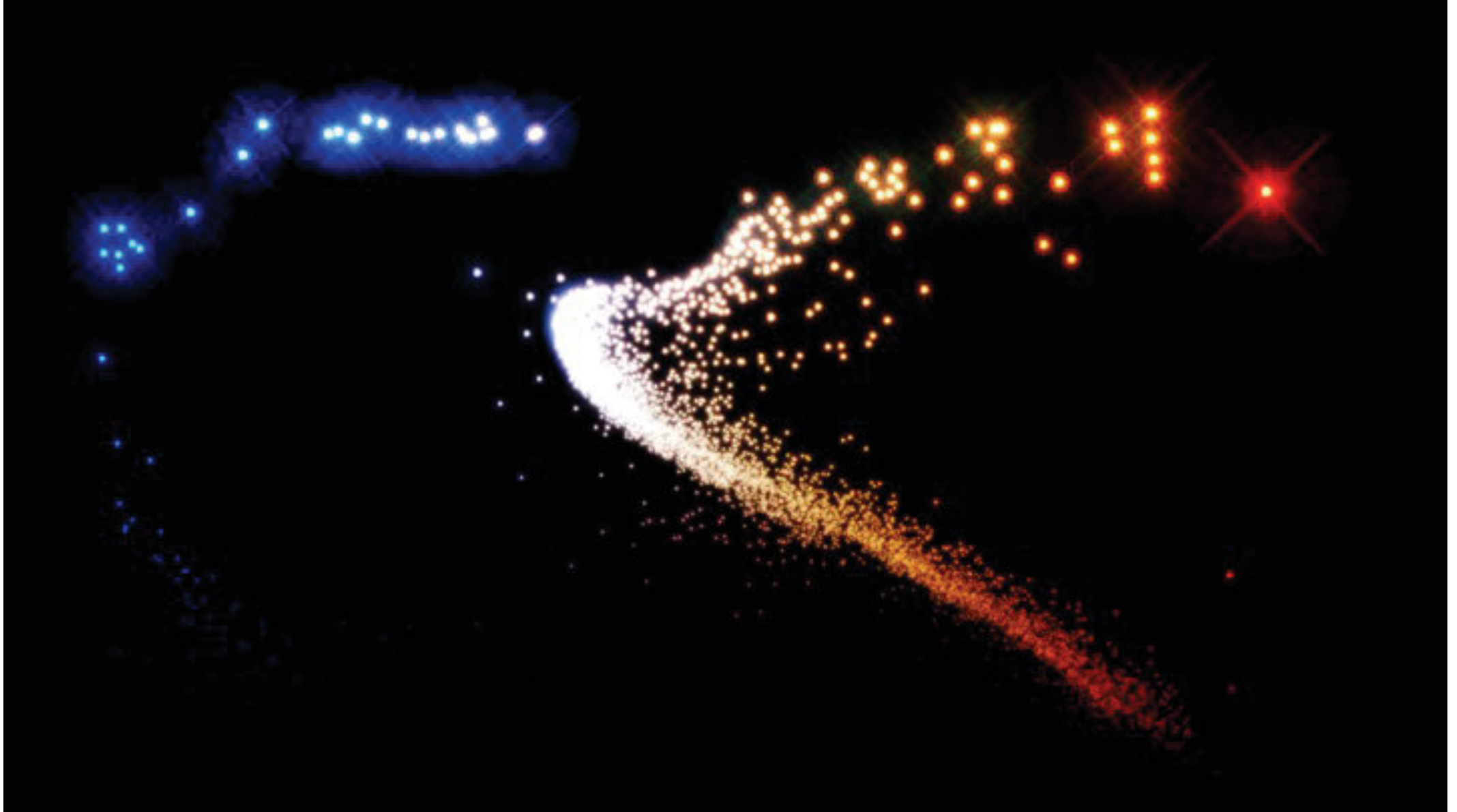


Omega Centauri with WFC3/HST
Jay Andersen



AstroTechTalk - July 1, 2016



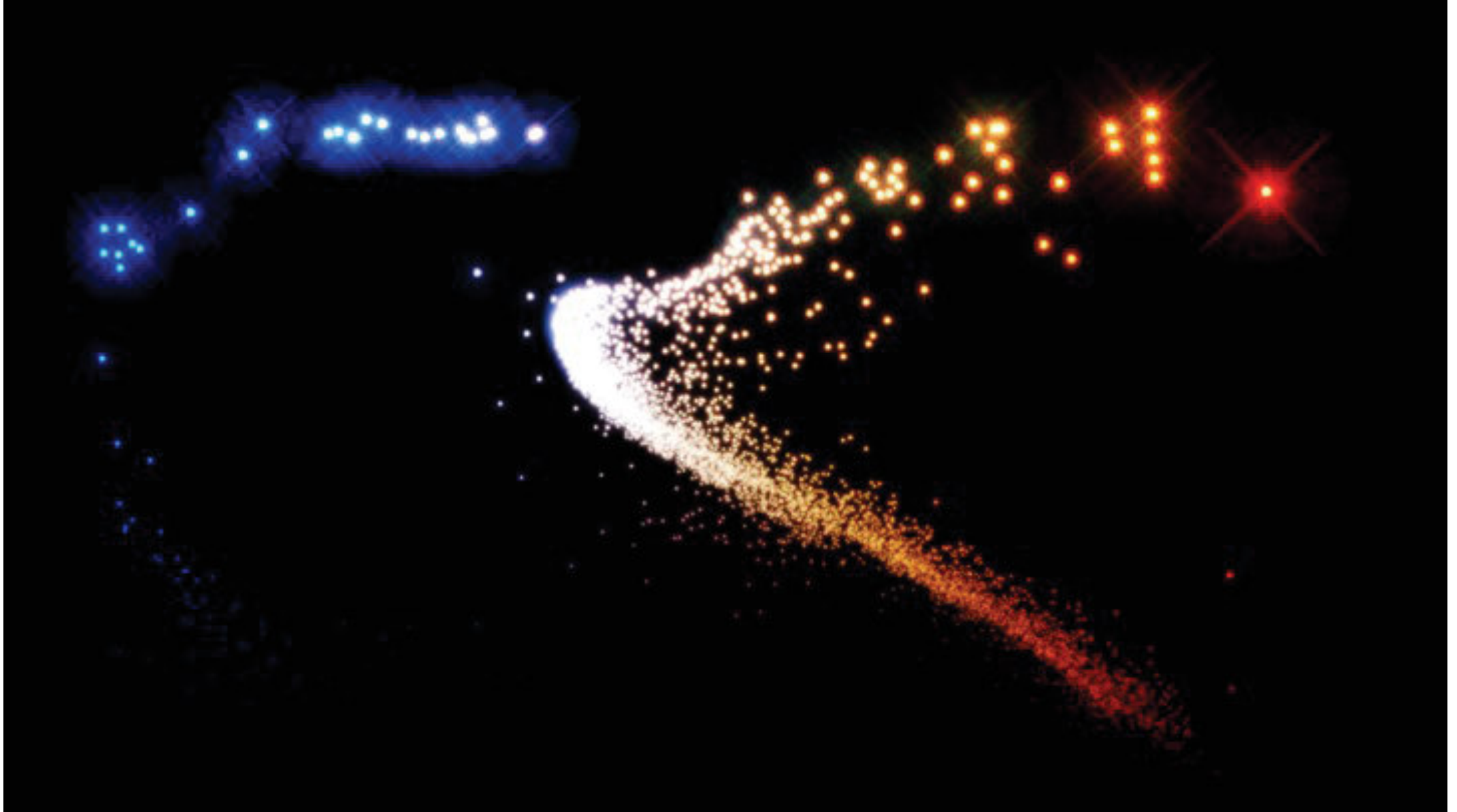


Omega Centauri with WFC3/HST
Jay Andersen

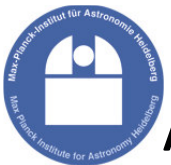


AstroTechTalk - July 1, 2016





Omega Centauri with WFC3/HST
Jay Andersen



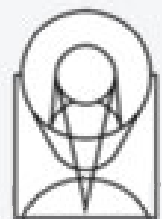
AstroTechTalk - July 1, 2016





ARGOS will help to characterise the faint,
red end of the population.

Omega Centauri with WFC3/HST
Jay Andersen



G192.16-3.82

young stellar
object YSO

- high mass
- outflow
- jet
- HII region

goal:

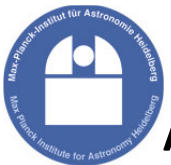
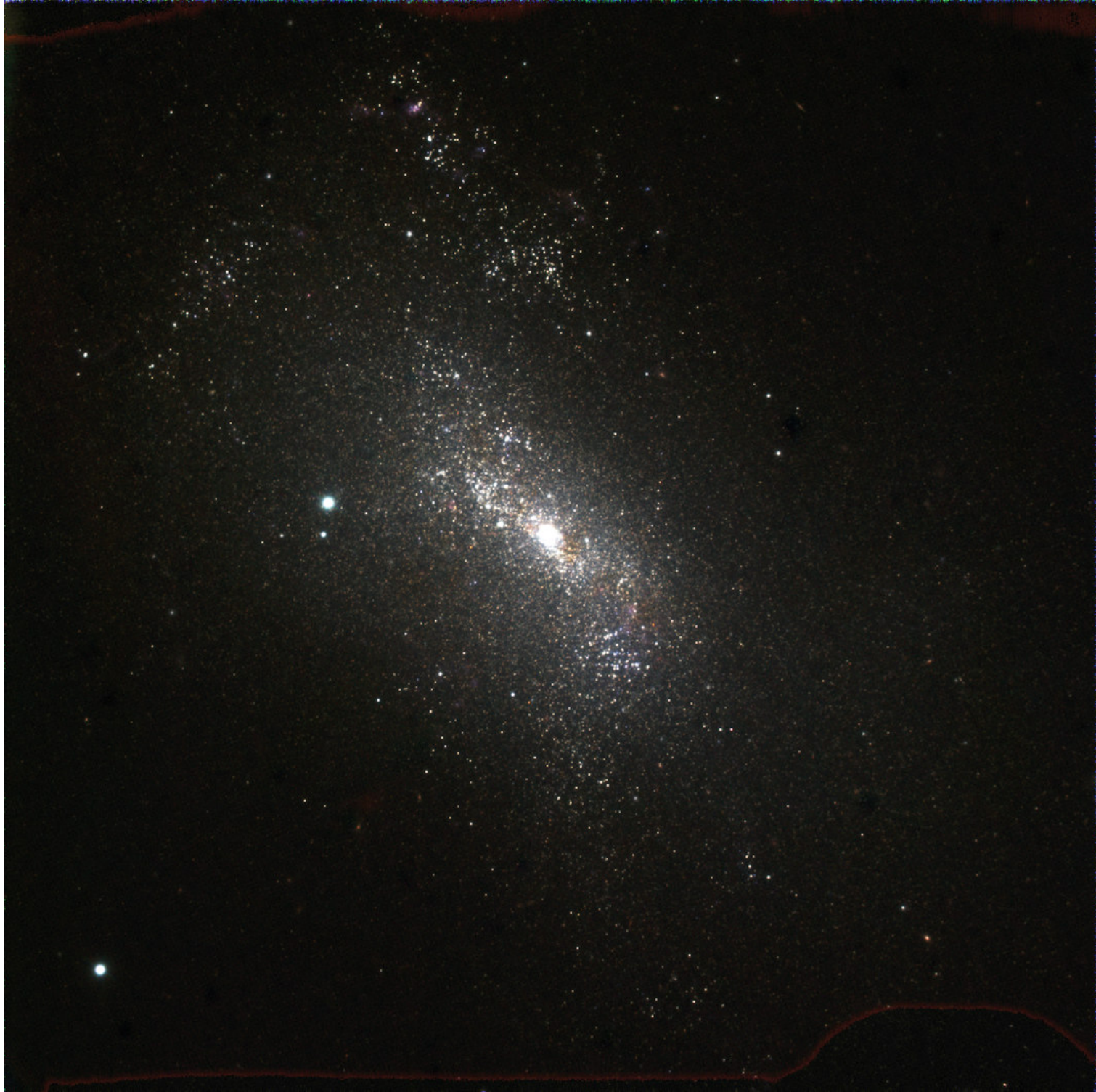
- velocity of
the outflow
- motion of
the jet

repeated obs.



NGC 4449

D ~ 4Mpc
~13 Mio ly



AstroTechTalk - July 1, 2016

Nadine Neumayer

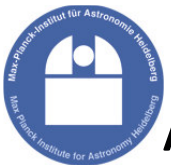
NGC 6384

D ~ 25Mpc
~ 80 Mio ly

J - 775s

H - 1030s

K_S - 50s



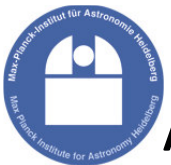
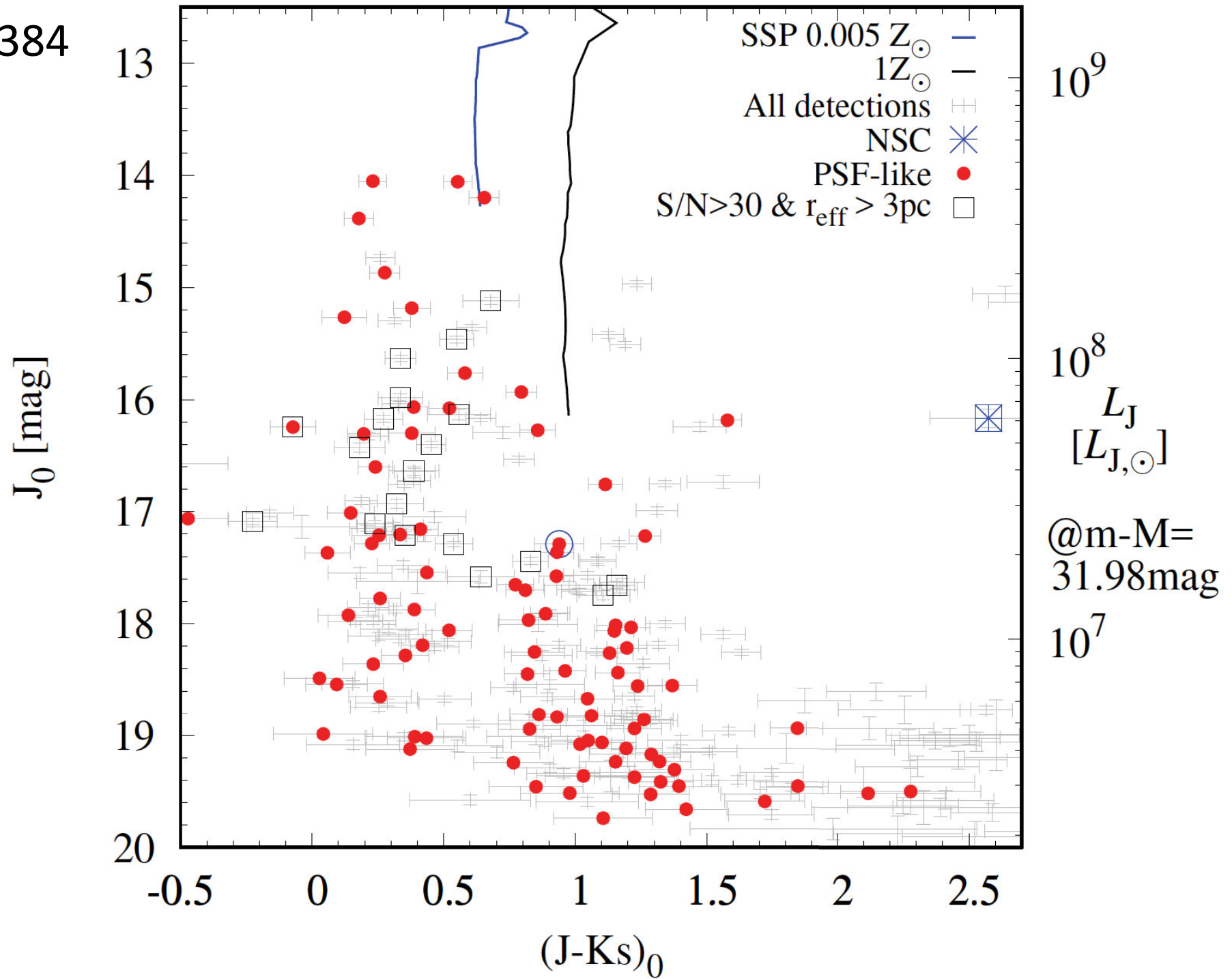
NGC 6384



AstroTechTalk - July 1, 2016

Nadine Neumayer

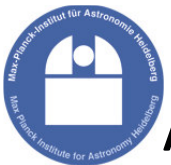
NGC 6384



Maffei 1



Maffei 1



NGC 6946



AstroTec

umayer

spectroscopy



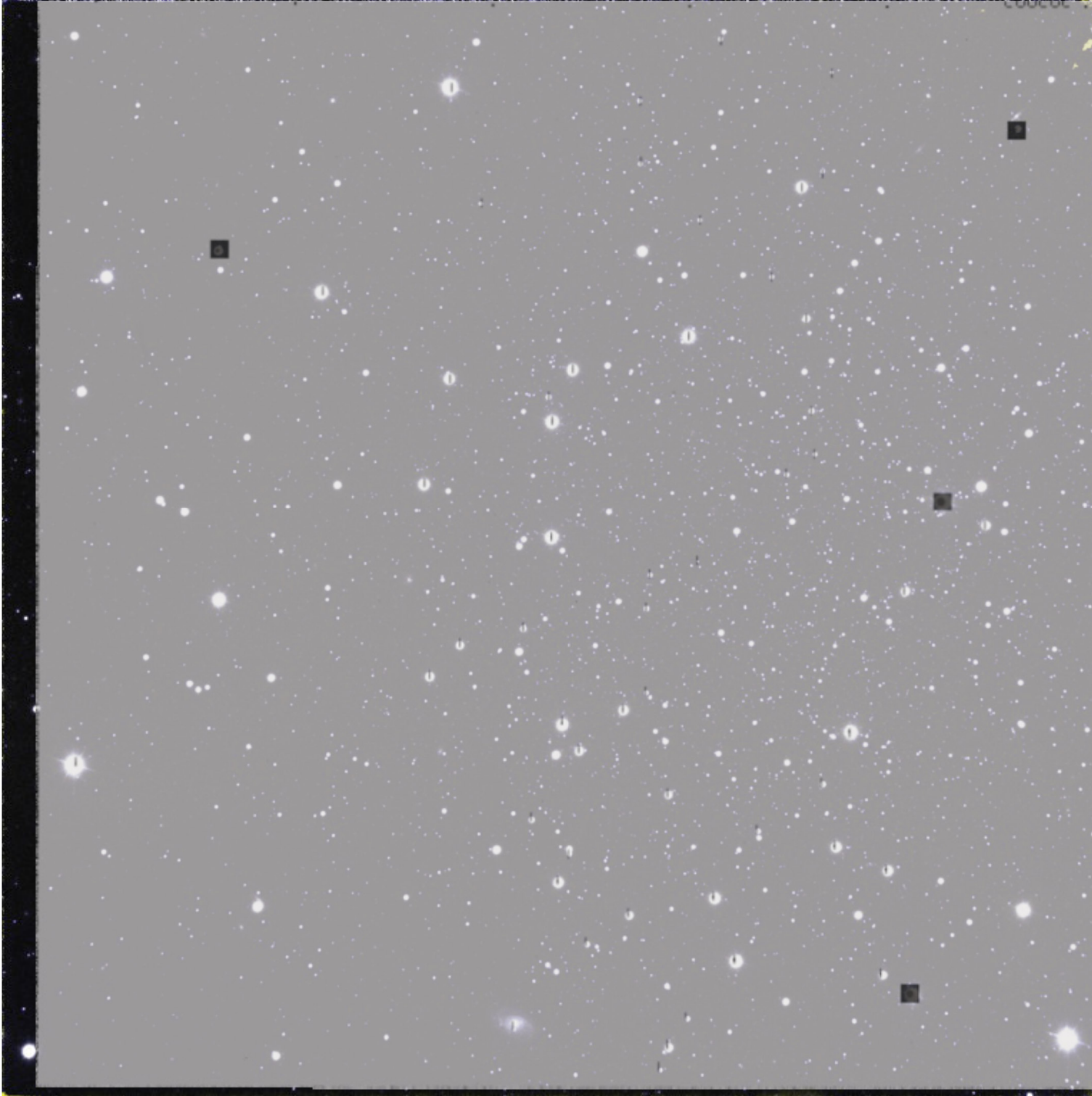
NGC 5466



AstroTechTalk - July 1, 2016

Nadine Neumayer

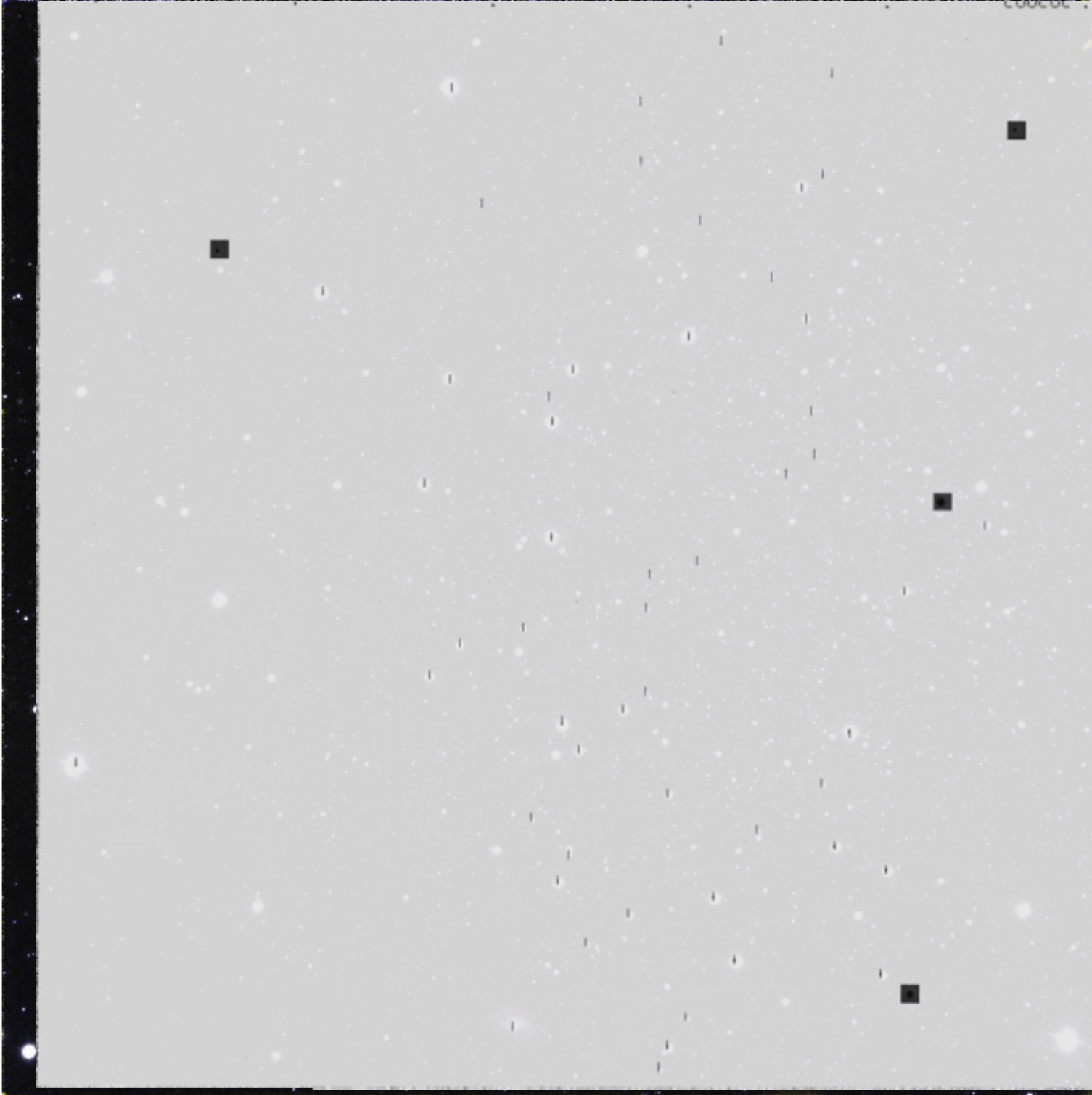
NGC 5466



AstroTechTalk - July 1, 2016

Nadine Neumayer

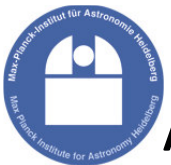
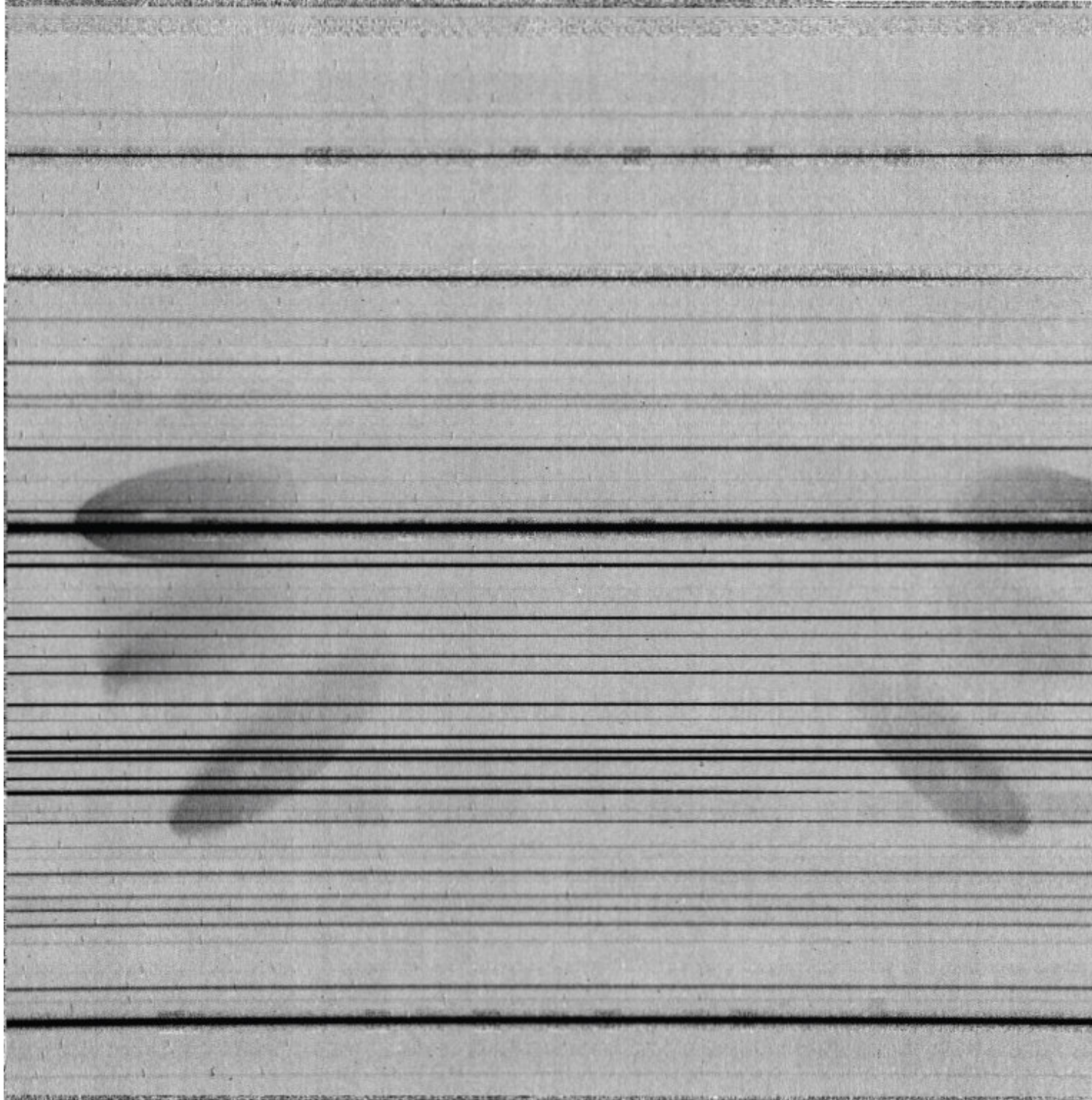
NGC 5466



AstroTechTalk - July 1, 2016

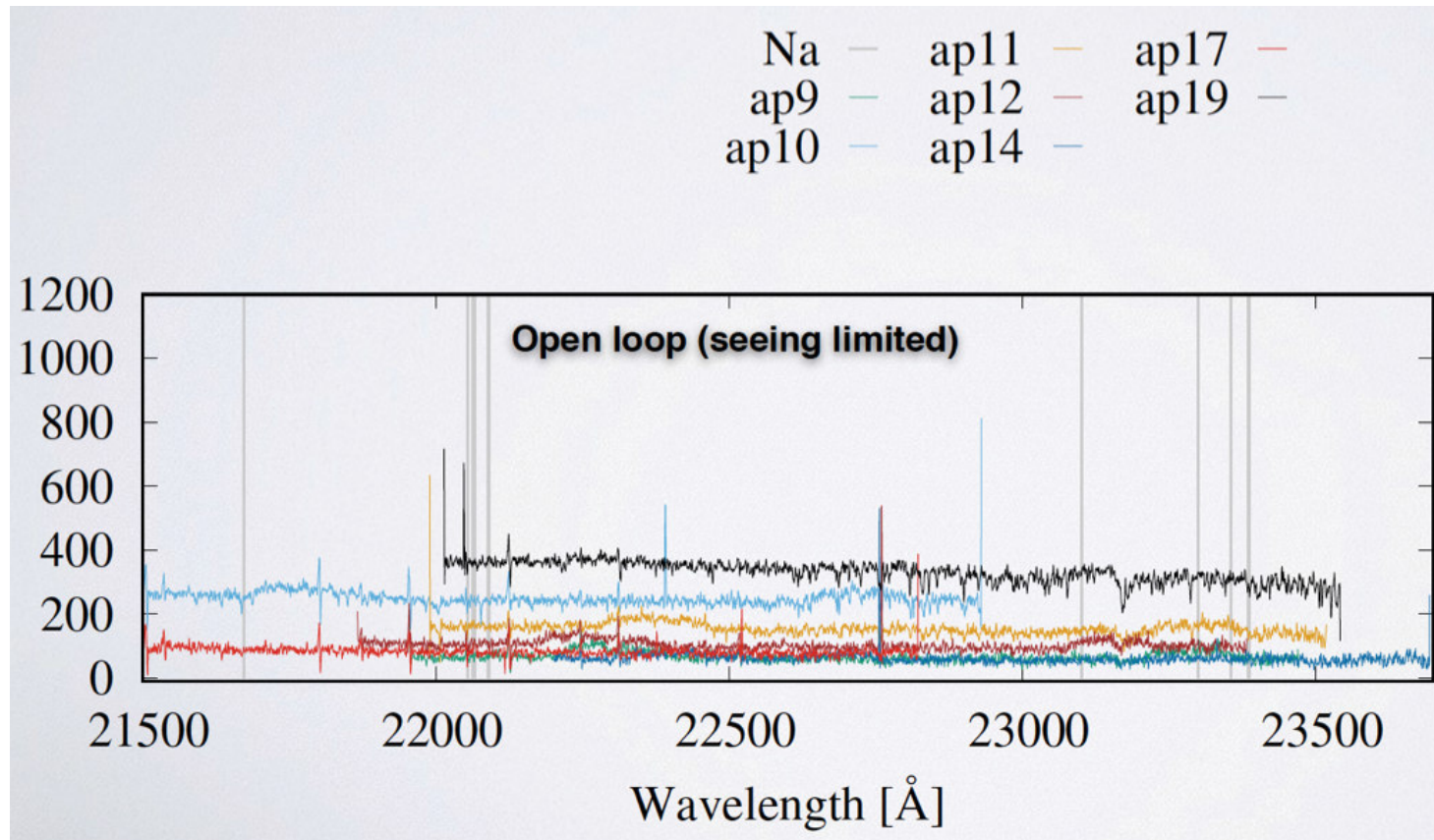
Nadine Neumayer

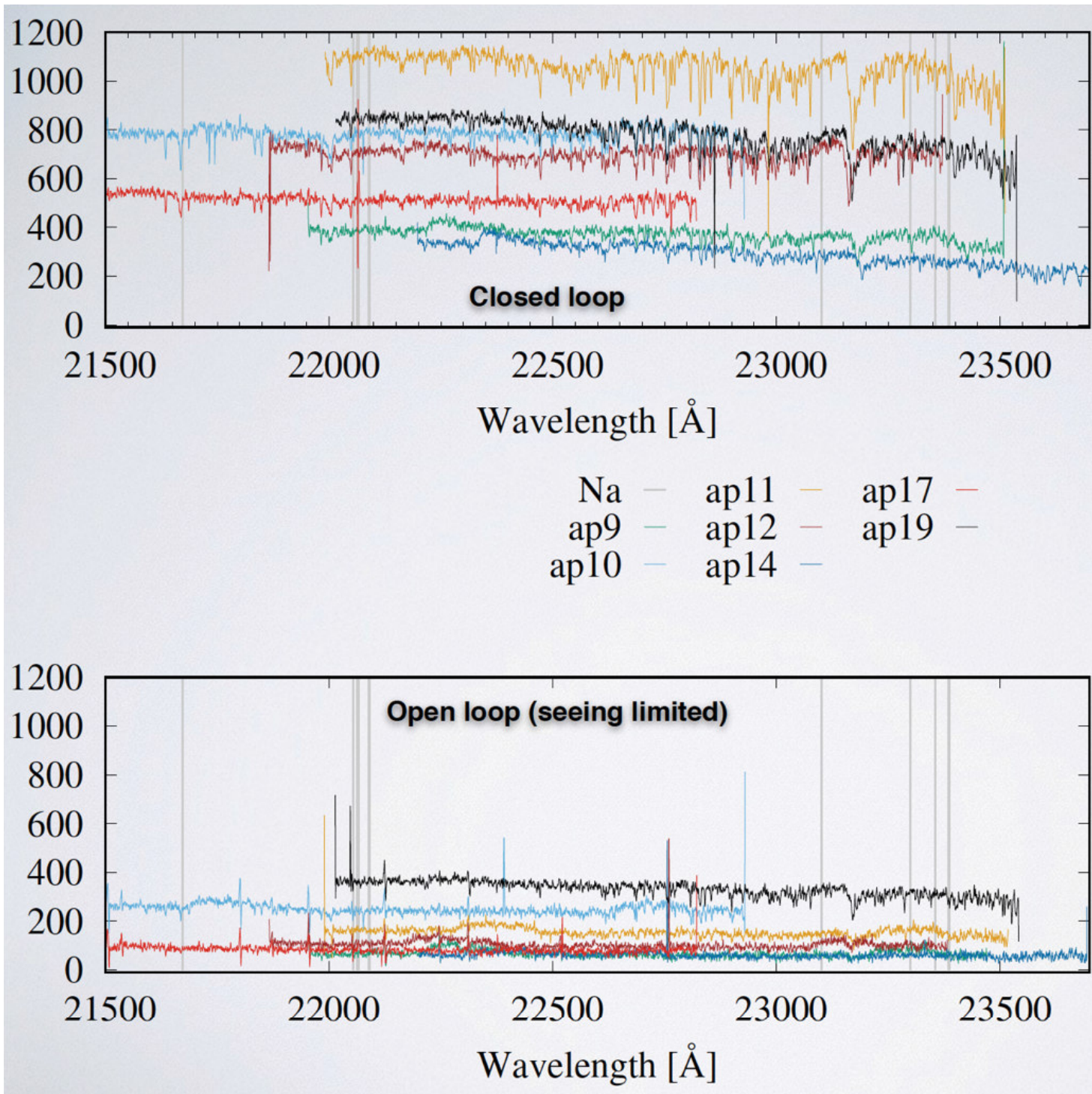
NGC 5466



AstroTechTalk - *July 1, 2016*

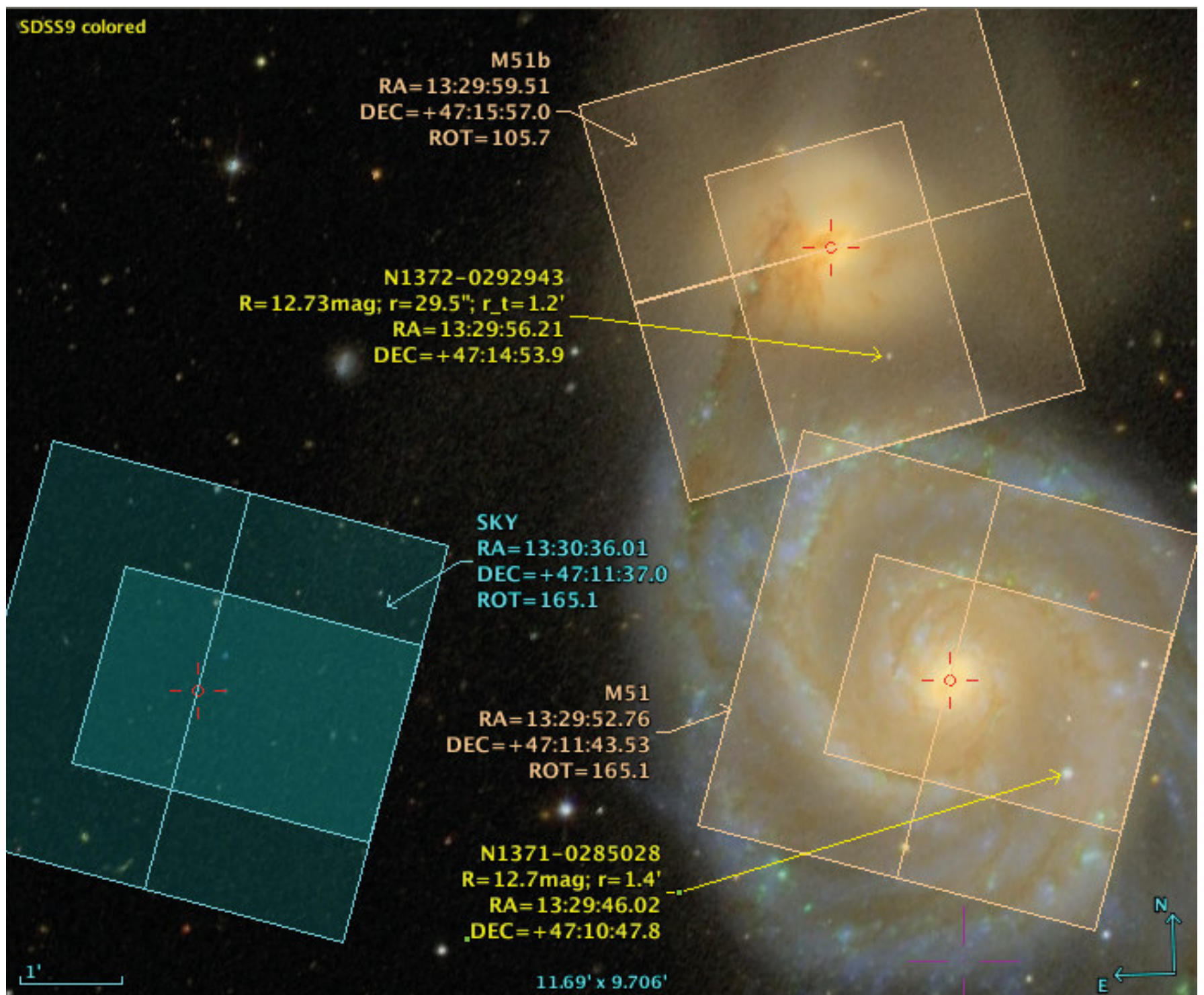
Nadine Neumayer



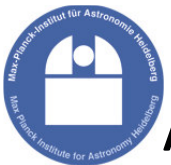
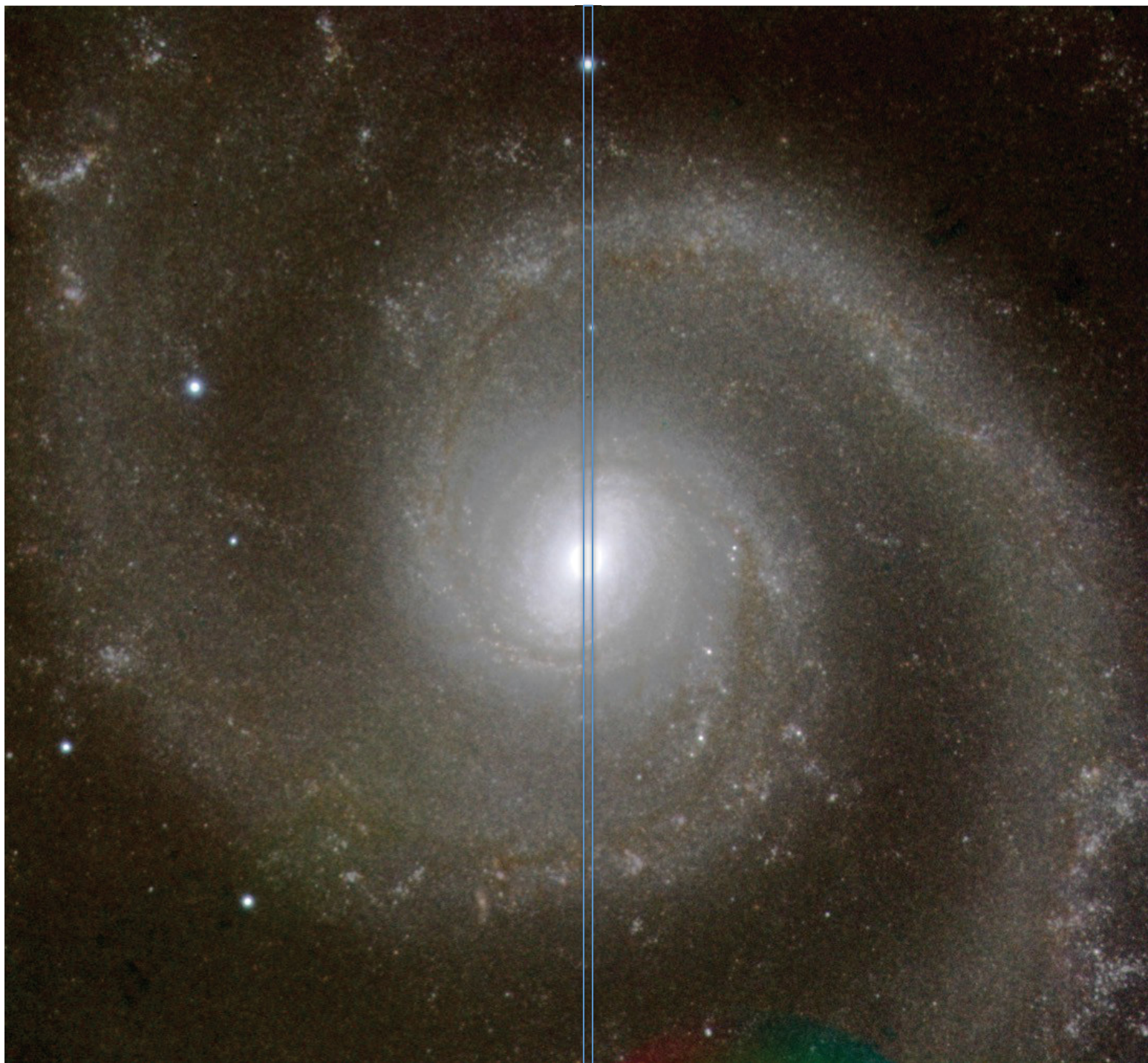


M51

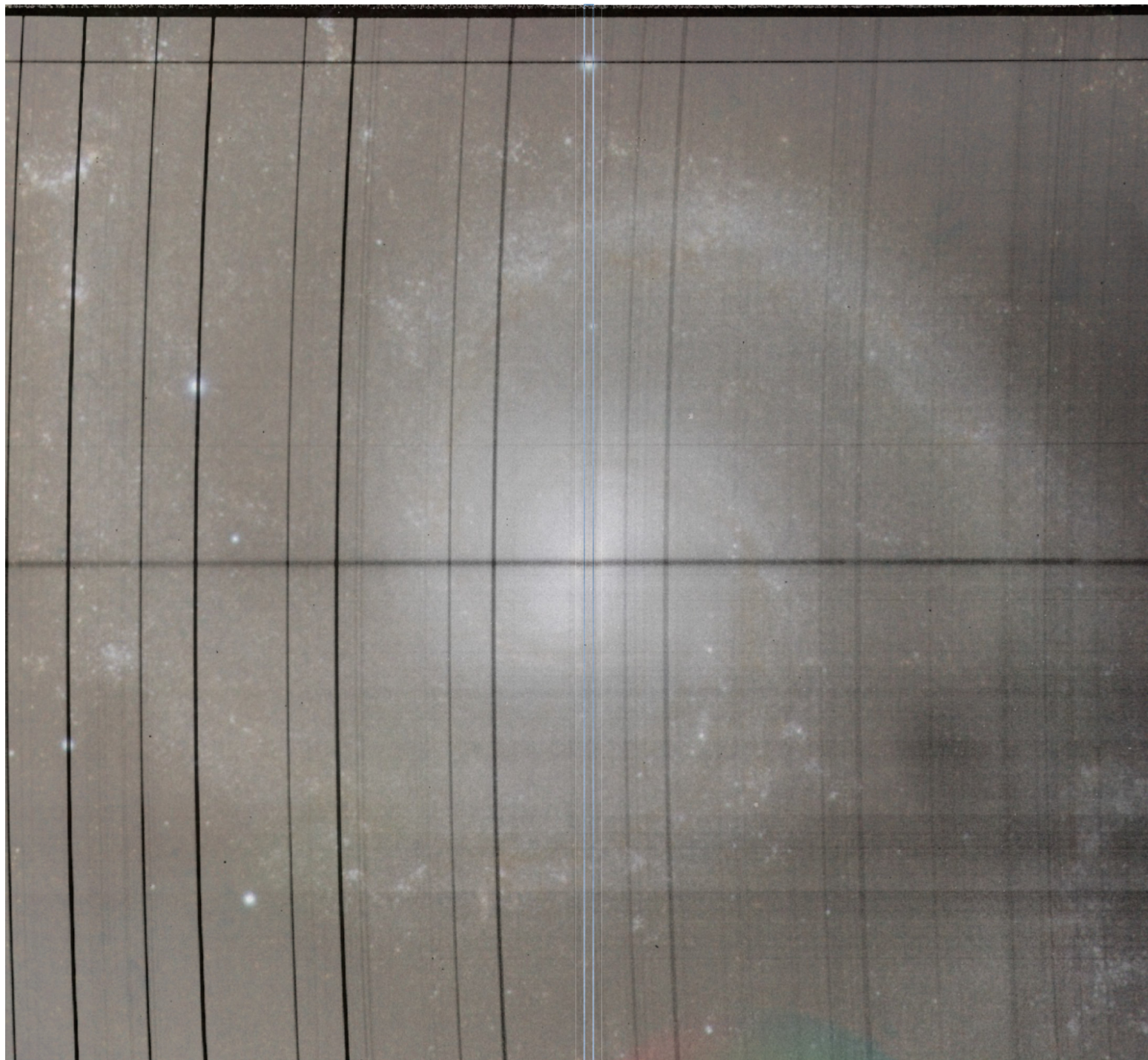
D ~ 8Mpc



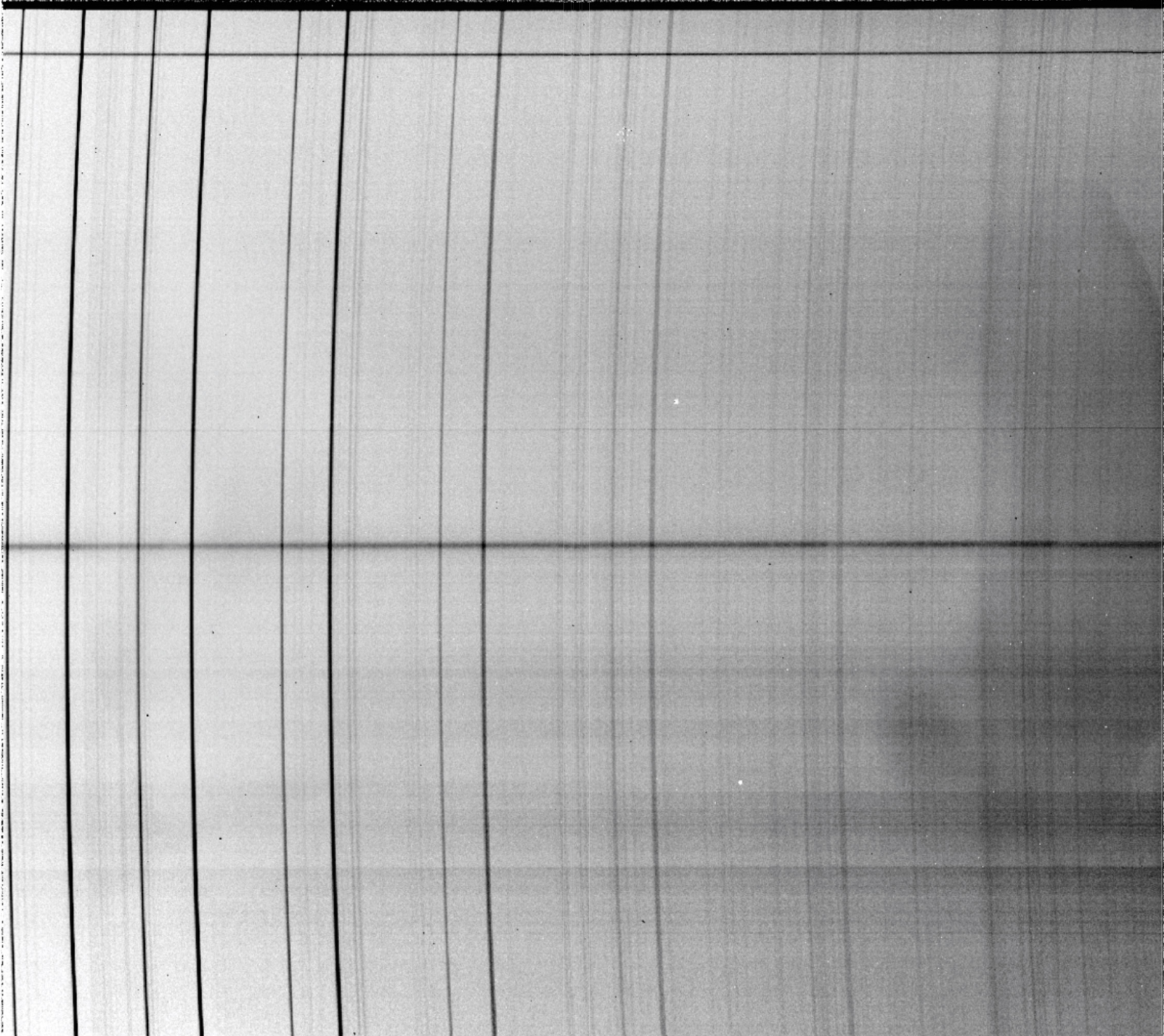
M51



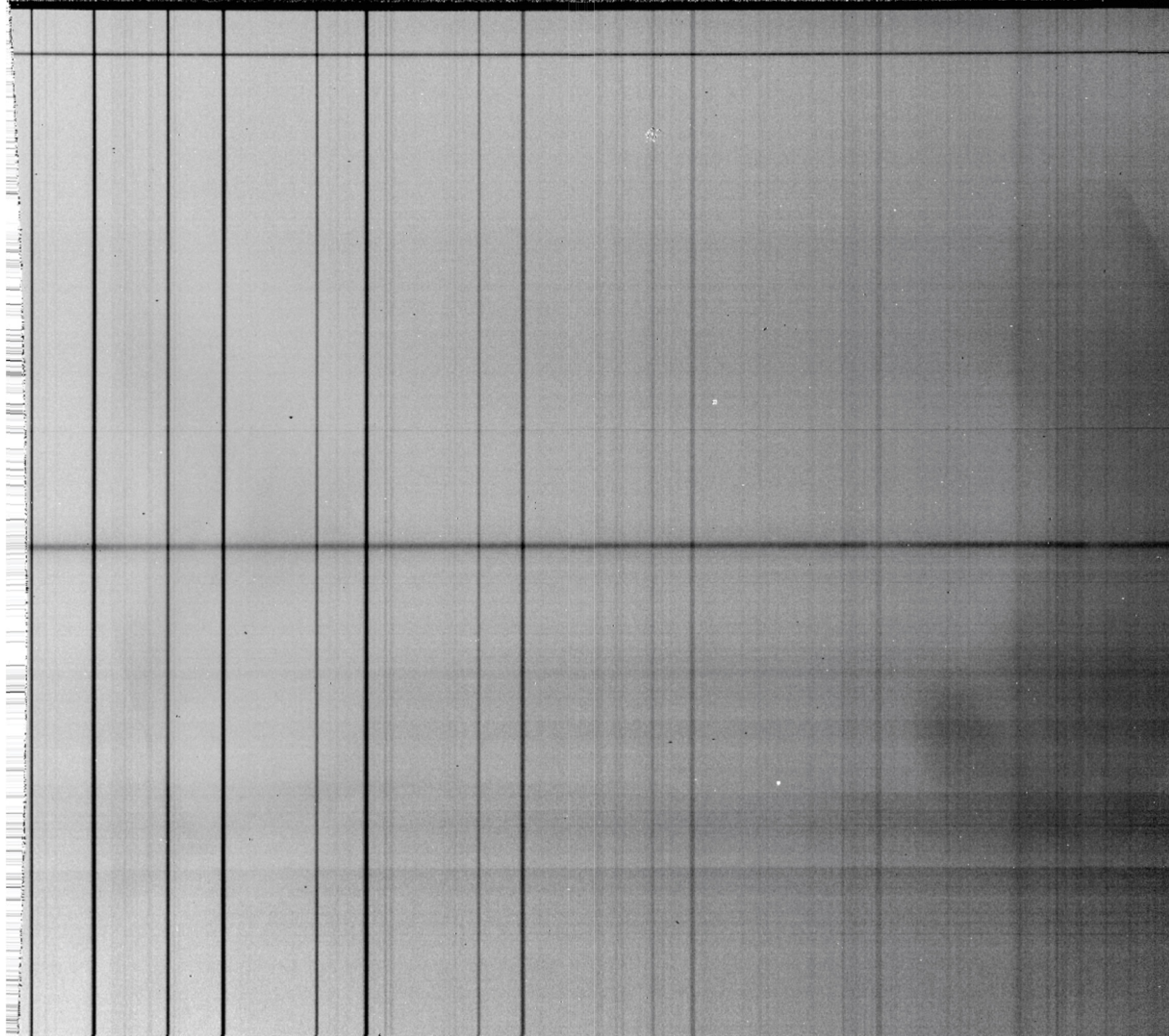
M51



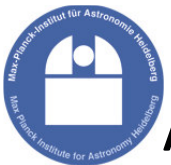
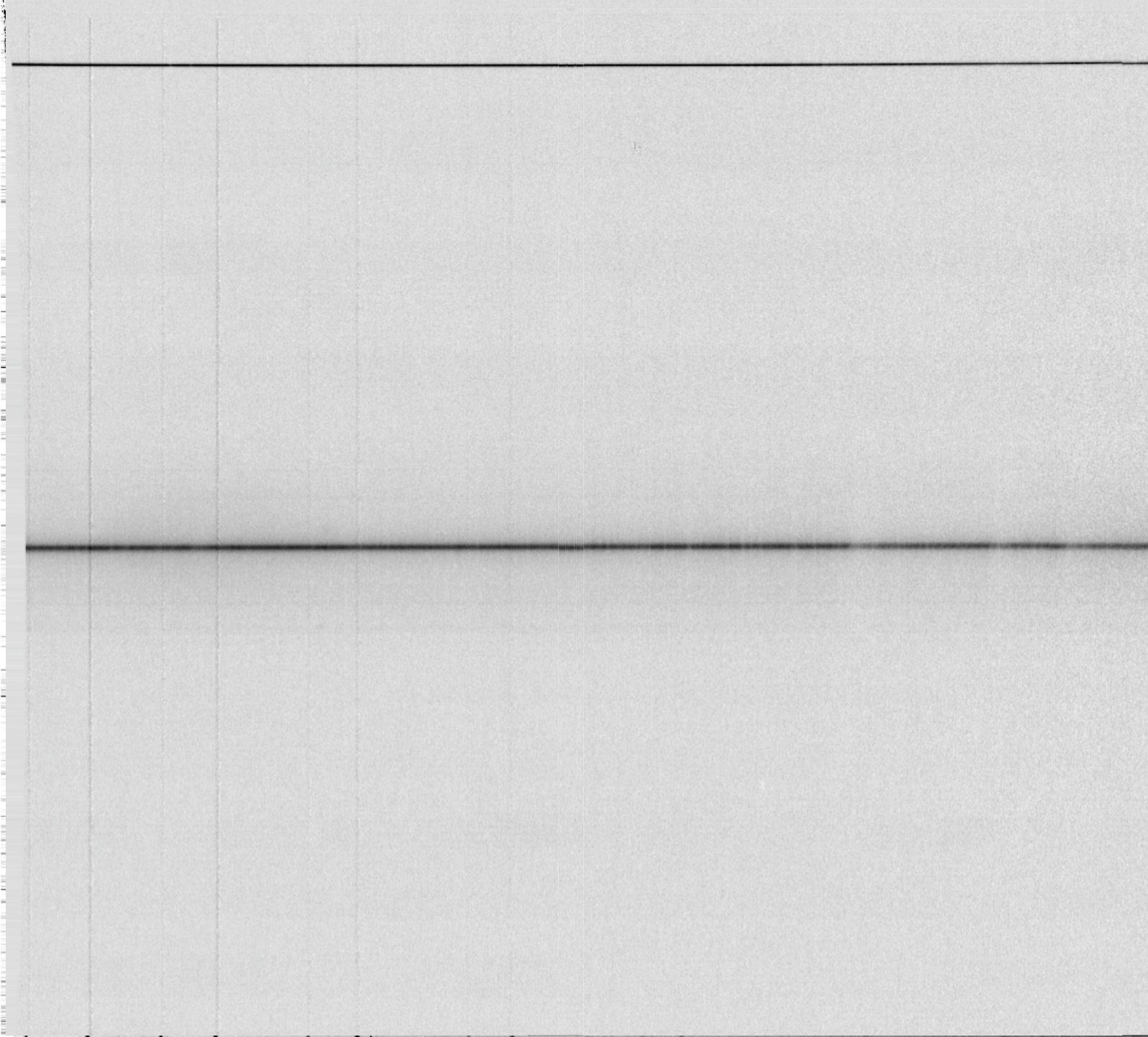
M51



M51

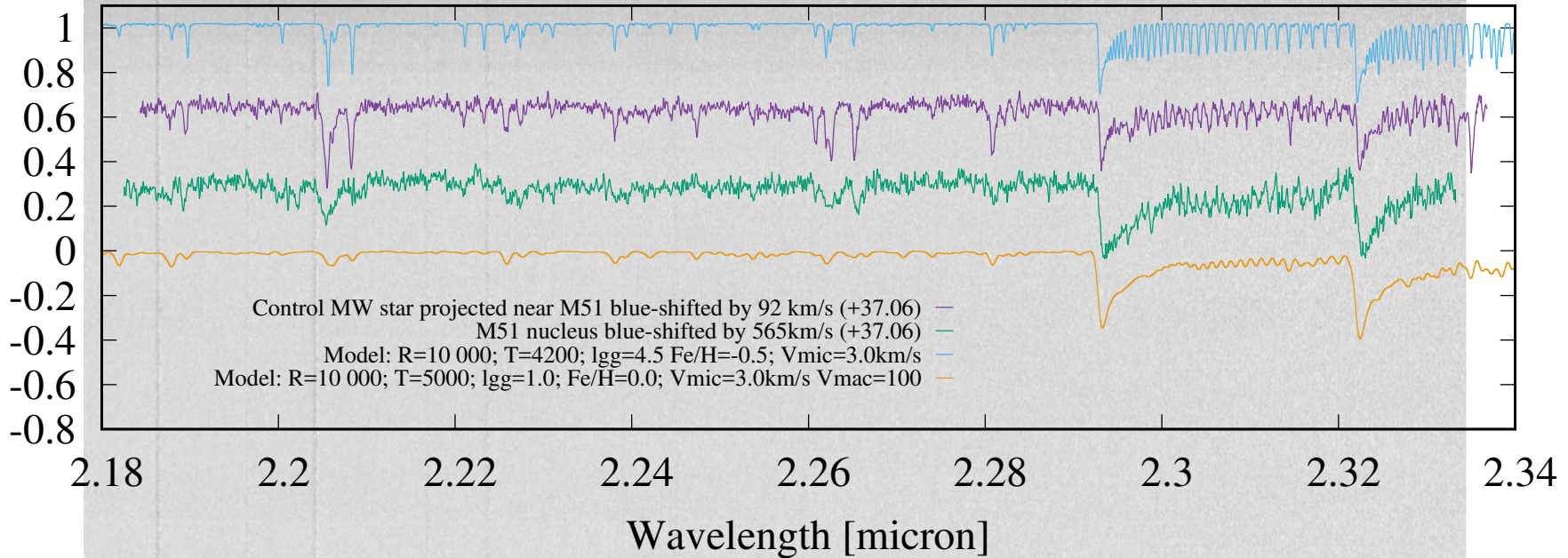


M51



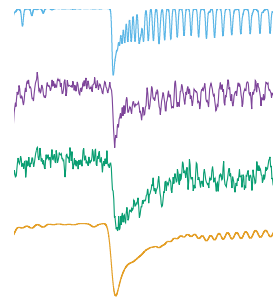
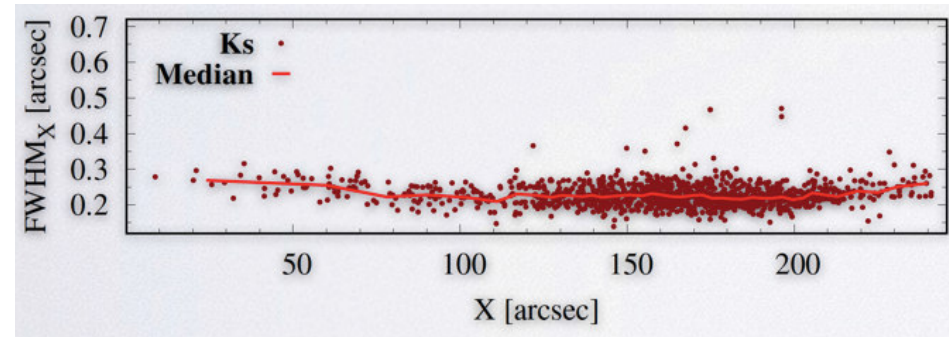
M51 

Normalized flux



Summary

ARGOS works!
PSF 2-3 times sharper
quite uniform over 4'x4'



great commissioning data
imaging and spectroscopy

we work on characterising
star clusters and measuring
black hole masses

