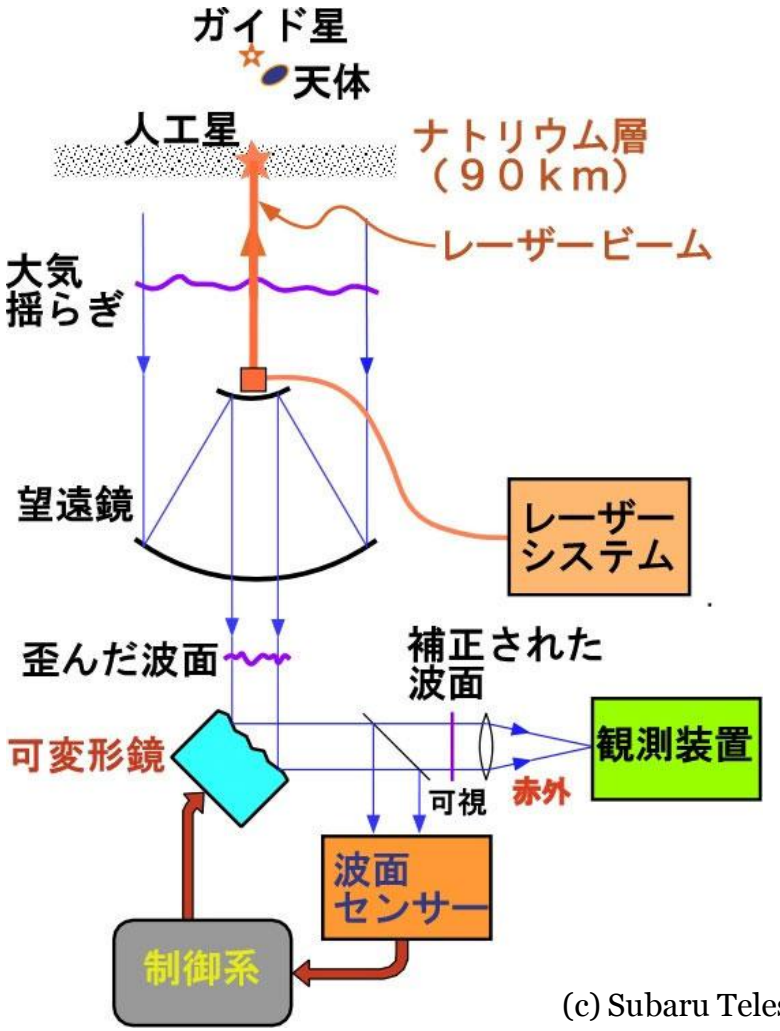
autonomous and replicable laser-adaptive-potics and science system

M1 増田貴大

@雑誌会 10月速報

arXiv 1210.0532

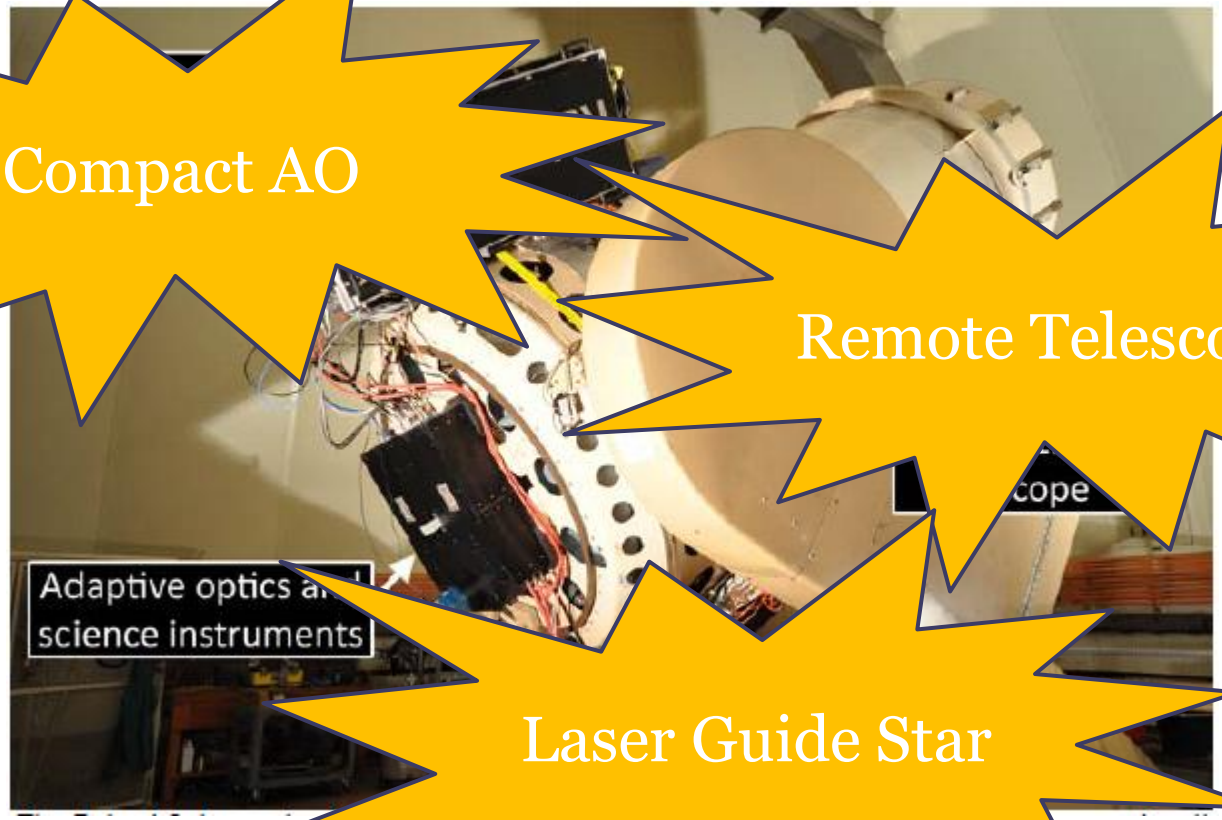
AO (adaptive optics)



- 波面測定
- 内部処理
- 波面補正

- レーザーガイド星

Robo-AO on Palomar 1.5m

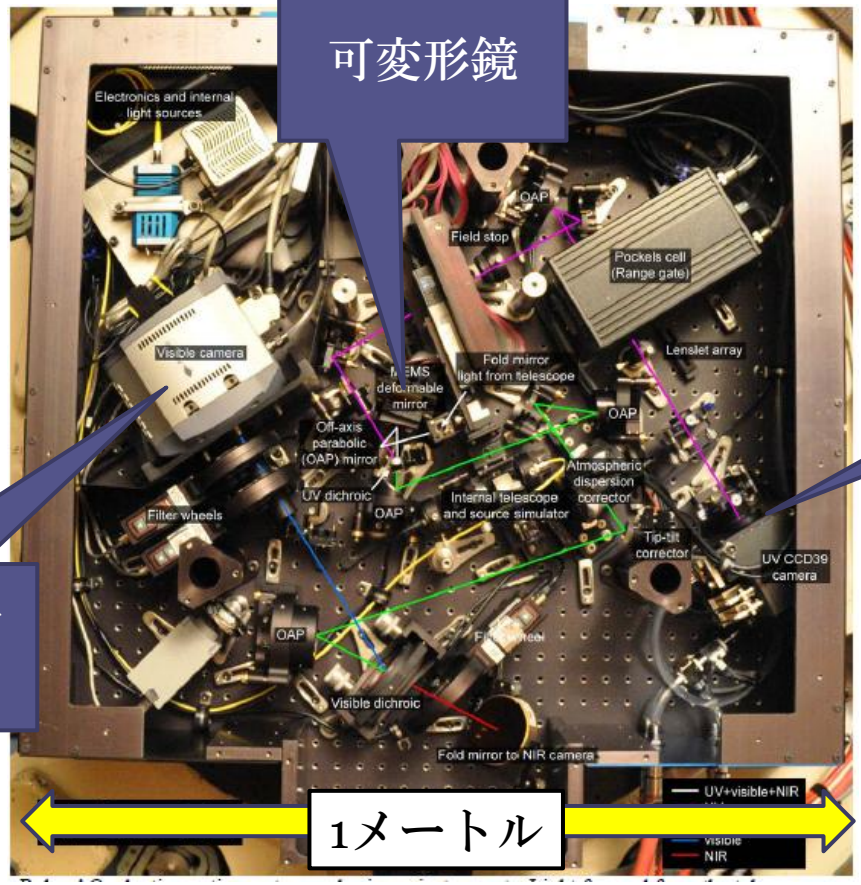


Compact AO

Remote Telescope

Laser Guide Star

System



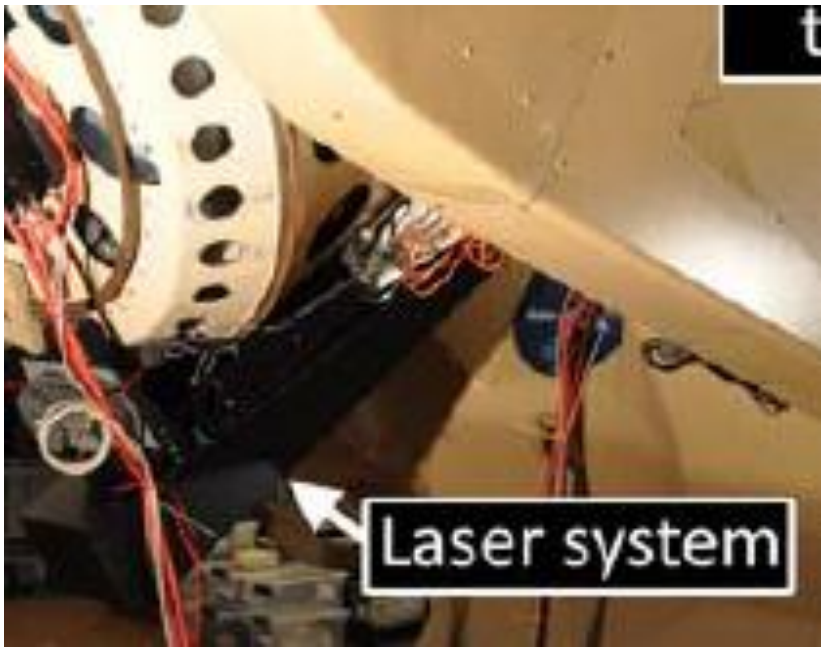
可変形鏡

波面センサ

可視光カメラ
EM-CCD

1メートル

Laser guider

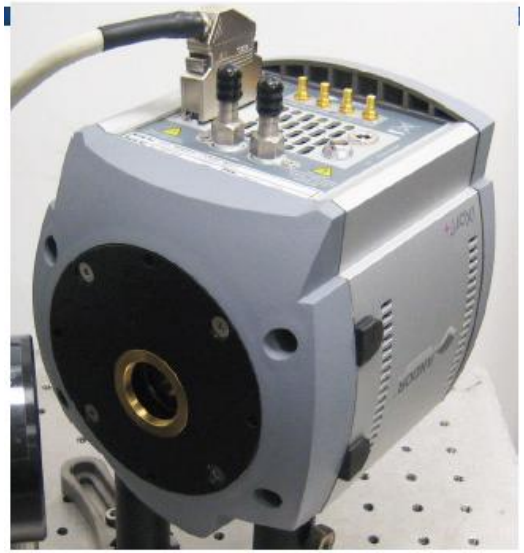


- 10W Rayleigh Laser
- 10km上空にレーザーを集光
- 望遠鏡のたわみによるポインティングのズレ＆ガイド星の揺れ
  →内蔵のミラーで修正

Cameras

可視光カメラ(EM-CCD)

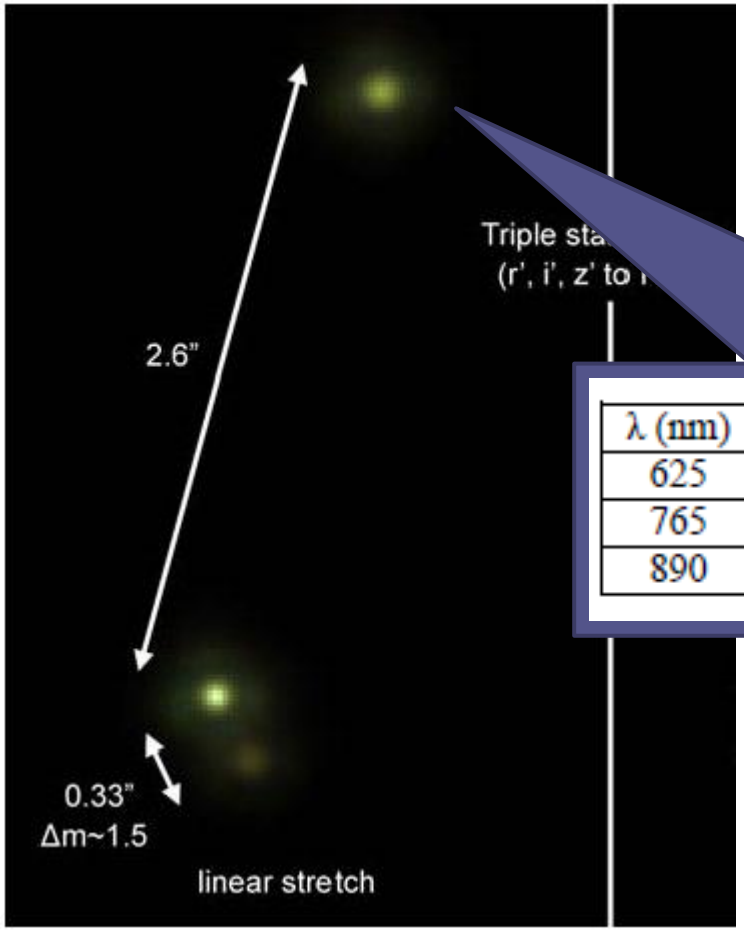
- 高速撮影が可能(>30Hz)



赤外カメラ(InGaAs)

- 現時点ではEngineering Gradeで観測には使えない

ON-Sky AO Correction①



λ (nm)	FWHM	Strehl	RMS WFE (nm)
625	0.11"	7.1%	161
765	0.12"	14.7%	168
890	0.14"	20.4%	178

回折限界
0.08″
0.10″
0.12″

ON-Sky AO Correction②

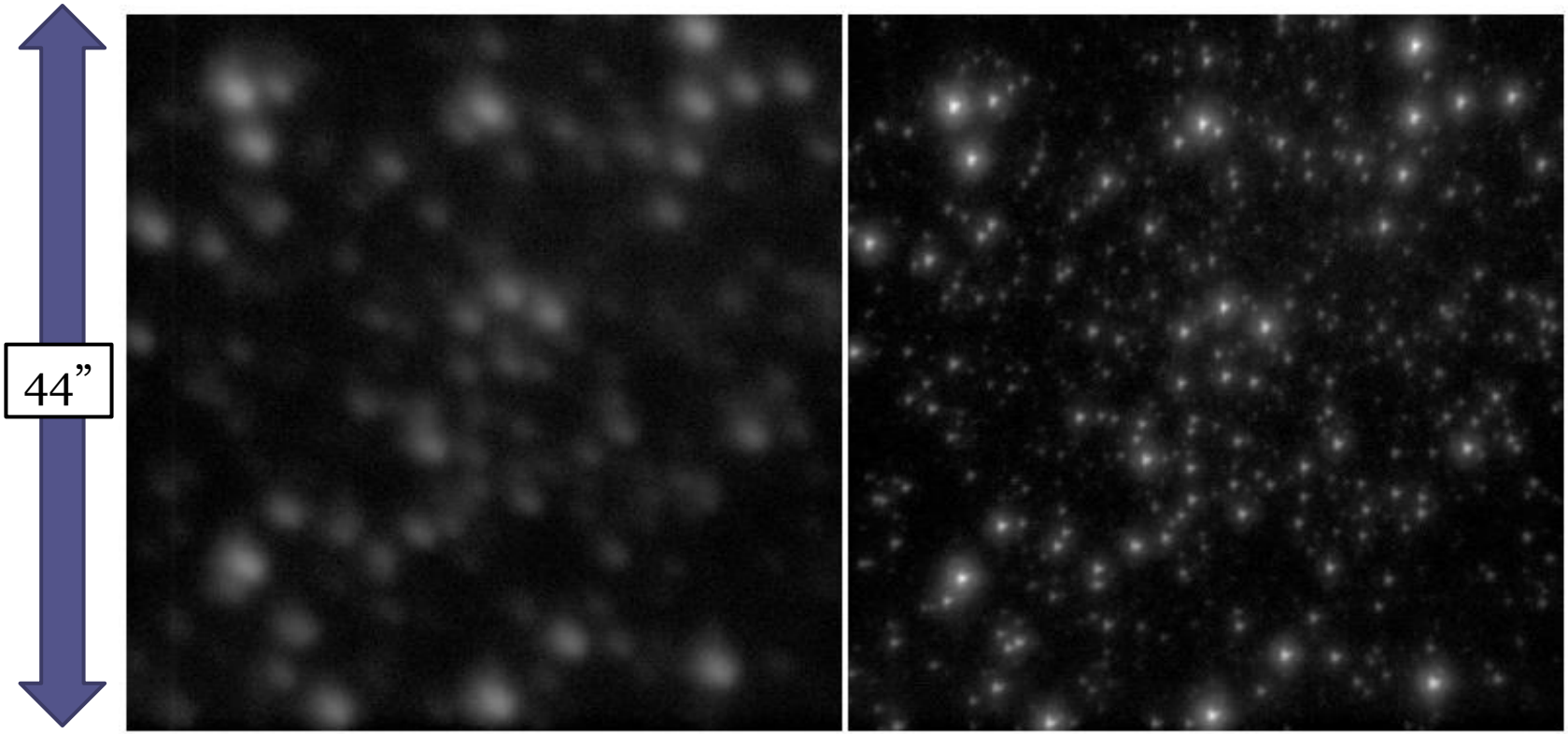


Figure 6. Left: A 44" × 44" field-of-view, 2-minute long seeing-limited image of the core of the globular cluster Messier 3 in z-band (λ = 830 – 950 nm). The same image shown with Robo-AO adaptive optics correction.

Clones of Robo-AO

Summary

- PackageとしてのLGS-AOシステムの開発
- 1.5m級の回折限界に迫る性能
- IR CameraのUpdate予定

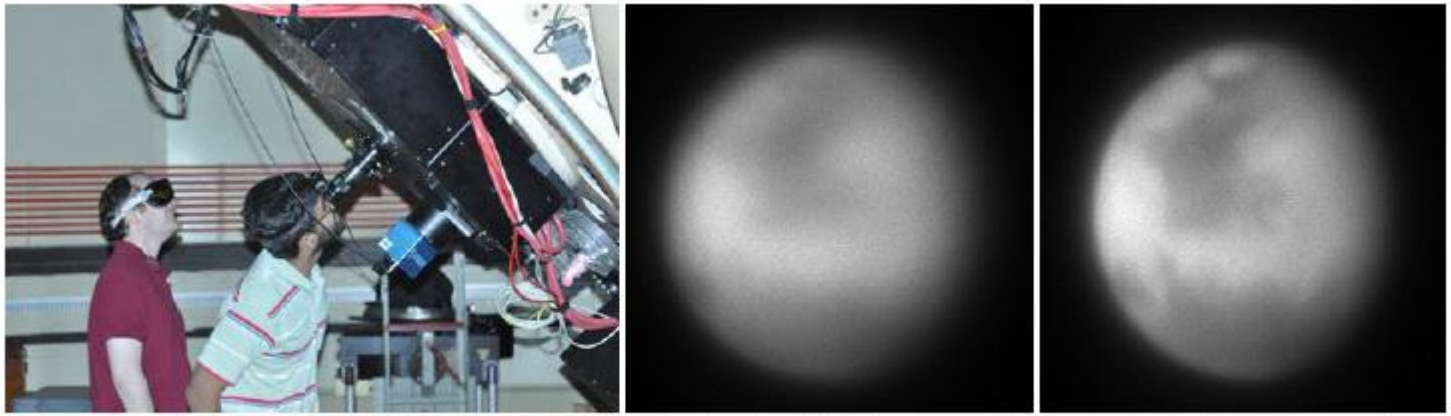


Figure 7. Members of the Robo-AO team observing Mars with the eyepiece attached to Robo-AO (left). Simultaneous i-band images of Mars captured without adaptive optics correction (middle) and with the Robo-AO system running (right).

でもそれ、お高いんでしょう・・・？