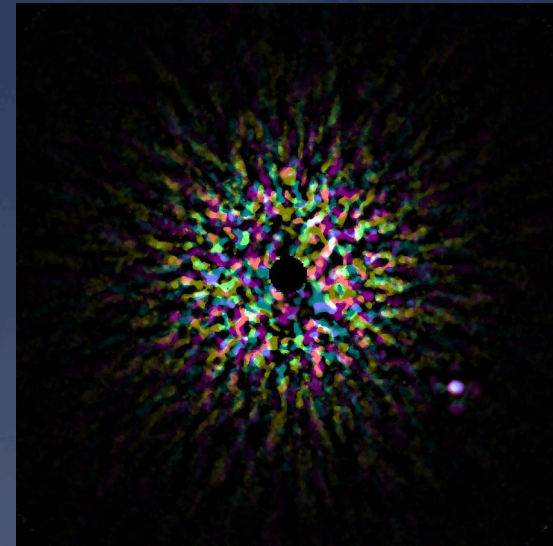


# The Subaru SEEDS Imaging Search for Exoplanets of High Mass Stars

Joe Carson  
College of Charleston

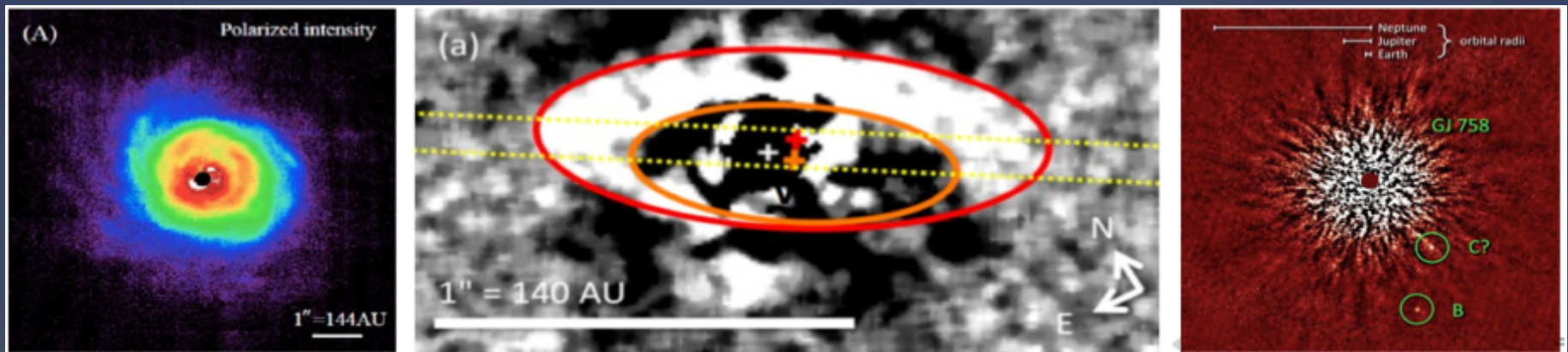


Co-investigators: Thea Kozakis, Laura Stevens, Mike McElwain, Christian Thalmann, Markus Janson, Motohide Tamura, Mickäel Bonnefoy, Josh Schlieder, Ryo Kandori, SEEDS science & instrument teams.

NCAD3. July 20, 2012

# SEEDS – Strategic Exploration of Exoplanets and Disks At Subaru

- \* First Subaru Strategic Observations. Headquartered at NAOJ.
- \* 120 nights in 5 years at Subaru. Began Fall 2009.
- \* Direct imaging and census of giant planets around stars in outer disk regions (4-40 AU)
- \* Exploring the diversity and evolution of protoplanetary disks and debris disks
- \* Direct linking between planets and protoplanetary disks
- \* Full data release after 18 months (<http://smoka.nao.ac.jp>)



Slide material prepared, in part, by Mike McElwain.

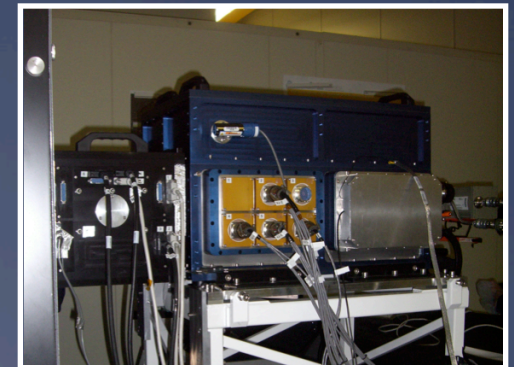
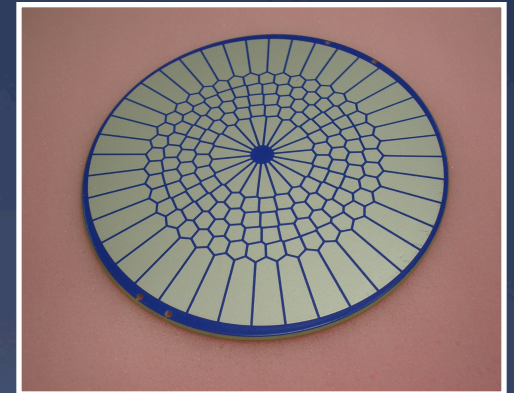
Joe Carson

# Subaru High Contrast Instrumentation

- \* Subaru – 8 m telescope
- \* AO 188 adaptive optics system
- \* Classical Lyot Coronagraph
- \* HiCIAO – NIR Science camera
  - \* Direct Imaging (1.2-2.3  $\mu\text{m}$ )
  - \* Simultaneous Differential Imaging
  - \* Polarization Differential Imaging



DI, SDI, PDI can be used with  
Angular Differential Imaging



# The Subaru SEEDS Sub-survey of Early Type (B and A type) Stars.

Why focus on early-type stars?

- Enable a statistical comparison with other star types.
- High mass stars have exhibited a higher frequency of planets.
- High mass stars are thought to be more efficient at forming high-mass planets.
- High mass stars may be able to form planets at larger separations.



*Joe Carson*

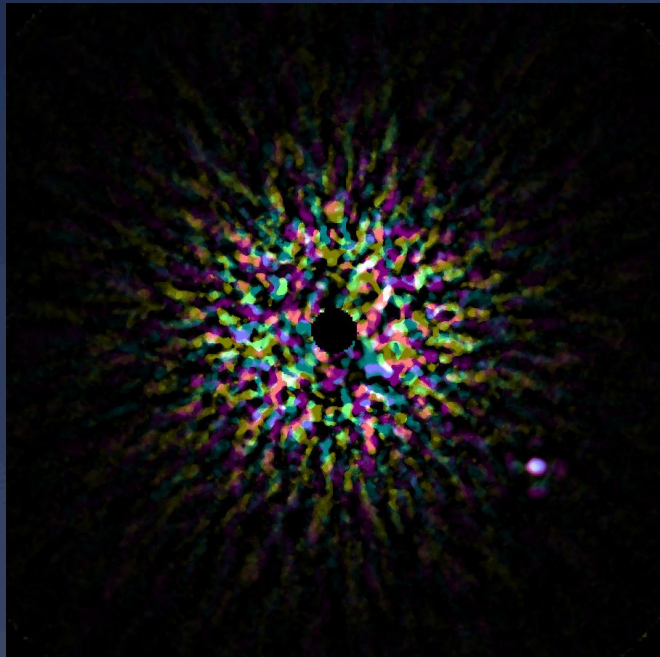
# The Subaru SEEDS Sub-survey of Early Type (B and A type) Stars.

## Status

- Observations began in 2009.
- 25 of 40 early type stars have been observed so far.
- Median distance  $\sim 25$  parsecs.
- Median age  $\sim 400$  Myrs
- Targets were selected according to:
  - youth
  - distance
  - lack of previous deep explorations



# The Subaru SEEDS Sub-survey of Early Type (B and A type) Stars.



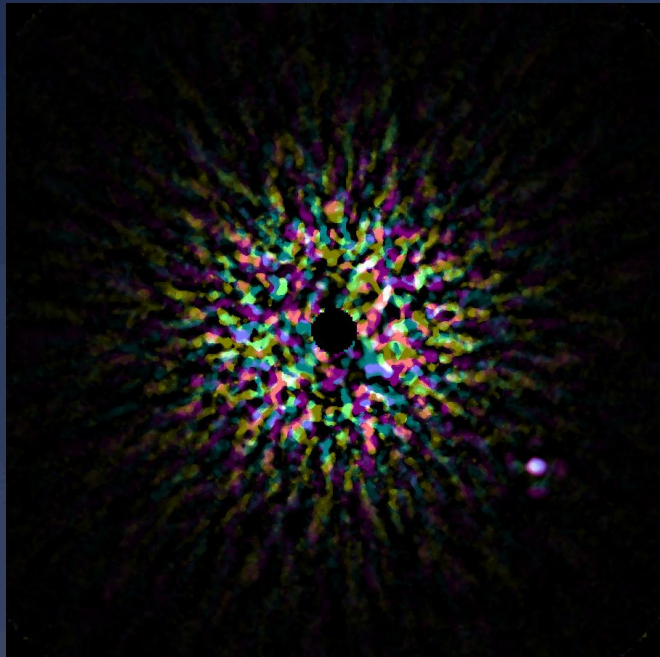
Color image prepared by Christian Thalmann.

Astrometry Plot



*Joe Carson*

# The Subaru SEEDS Sub-survey of Early Type (B and A type) Stars.



Color image prepared by Christian Thalmann.

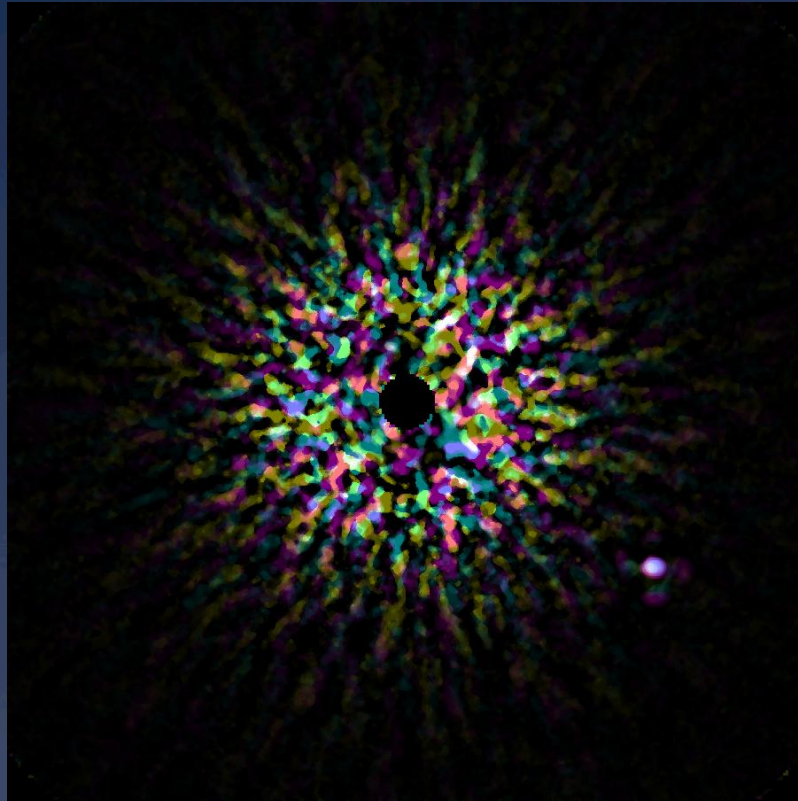
Color-Color Plot

Plot prepared by Mickael Bonnefoy.



*Joe Carson*

# The Subaru SEEDS Sub-survey of Early Type (B and A type) Stars.



Estimated Characteristics



*Joe Carson*