



CHARA Year in Review

Douglas Gies

CHARA Director, Regents' Professor
Department of Physics and Astronomy
Georgia State University, Atlanta, Georgia, USA
dgies@gsu.edu



LESIA



THE UNIVERSITY OF SYDNEY



Australian National University



KYOTO SANGYO UNIVERSITY

UNIVERSITY OF EXETER



1. Introduction

- Bienvenue à Nice!
- Eaton Fire
- Staff News
- Science News
- Conclusions

Mobile telescope near S1, S2



ANNUAL CHARA SCIENCE MEETINGS

<https://www.chara.gsu.edu/events/meetings>

- 2005 Paris
- 2006 Tucson
- 2007 New York
- **2009 Nice**
- 2010 Pasadena:
Caltech
- 2011 Atlanta
- 2012 Atlanta
- 2013 Flagstaff
- 2014 Ann Arbor
- 2015 Atlanta
- **2016 Nice**
- 2017 Pasadena:
Carnegie
- 2018 Paris
- 2019 Flagstaff
- 2021 Virtual
- 2022 Exeter, UK
- 2023 Atlanta
- 2024 Tucson
- **2025 Nice**



Nice 2009



Nice 2016

Year in Review

Charting Quantum Horizons:

ESTABLISHING A ROADMAP FOR MICROARCSECOND ASTRONOMY

2024 CHARA Science Meeting

12-14 March 2024

11 March 2024 Tucson Arizona

Scientific Organizing Committee

- Ryan Lau (NSF's NOIRLab; Astro Co-Chair)
- Amit Ashok (University of Arizona; Quantum Co-Chair)
- Douglas Gies (Georgia State University / CHARA)
- Saikat Guha (University of Arizona)
- John Monnier (University of Michigan)
- Joel Sánchez Bermúdez (National Autonomous University of Mexico)
- Gail Schaefer (Georgia State University / CHARA)
- Brian Smith (University of Oregon)
- Aazza Suleymanzade (Harvard)

Local Organizing Committee

- Julie Emms (University of Arizona / Center for Quantum Networks)
- Jessica Harris (NSF's NOIRLab)
- Zachary Hartman (International Gemini Observatory/NSF's NOIRLab)
- Lyann Lau (University of Arizona / Arizona Quantum Initiative)
- Brittany McClinton (NSF's NOIRLab)
- Isack Padilla (University of Arizona)
- Jayadev Rajagopal (NSF's NOIRLab)
- Gabe Richardson (University of Arizona)
- Stephen Ridgway (NSF's NOIRLab)

The Graduate Hotel Tucson Arizona

Scientific Organizing Committee

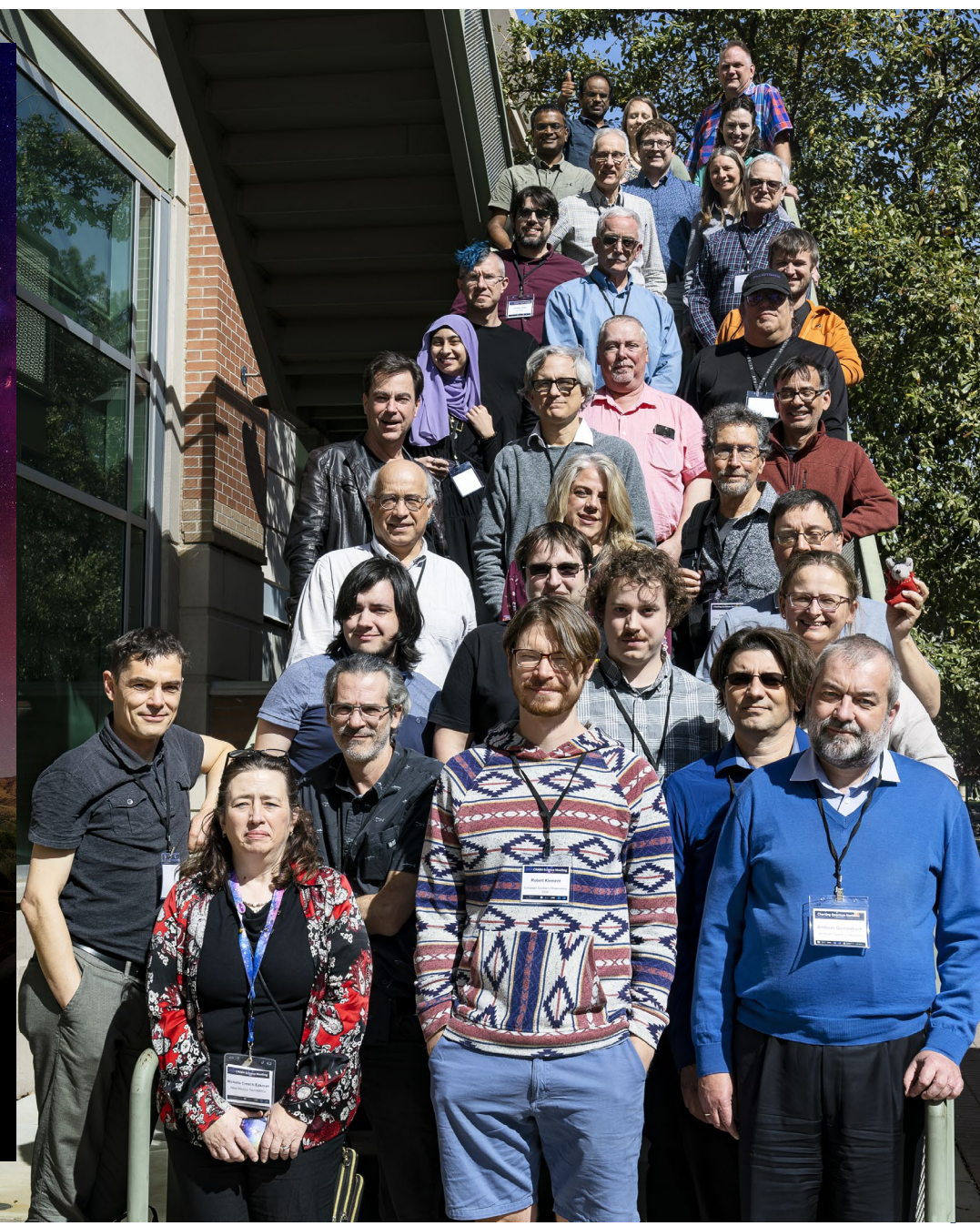
- Douglas Gies (Georgia State University / CHARA)
- Jeremy Jones (Georgia State University / CHARA)
- Jayadev Rajagopal (NSF's NOIRLab)
- Gail Schaefer (Georgia State University / CHARA)
- Nic Scott (Georgia State University / CHARA)

Local Organizing Committee

- Ryan Lau (NSF's NOIRLab)
- Jessica Harris (NSF's NOIRLab)
- Stephen Ridgway (NSF's NOIRLab)
- Alicia Rice (Georgia State University / CHARA)

<https://www.chara.gsu.edu/meetings/chara2024>

noirlab.edu/science/events/websites/astro-quantum-interferometry-workshop-2024/



CHARA's Founding Scientists



Prof. Hal McAlister – sends greetings



Dr. Theo ten Brummelaar - *here*



Dr. Steve Ridgway - *here*





- CHARA Array at Mount Wilson Obs.: *science and innovation*
- Year of improvements in operations, AO, beam combiners, and mobile telescope
- Observing semesters:
A (March - July)
B (August – December)
- 2026A proposals are due September 30
- Internal or NOIRLab submissions





CHARA Funding

- **U.S. NSF**
New \$3.5M award
- **Georgia State University,
College of Arts & Sciences**

Visit by Provost
October 2024



LESIA



THE UNIVERSITY OF SYDNEY



Australian National University



KYOTO SANGYO UNIVERSITY

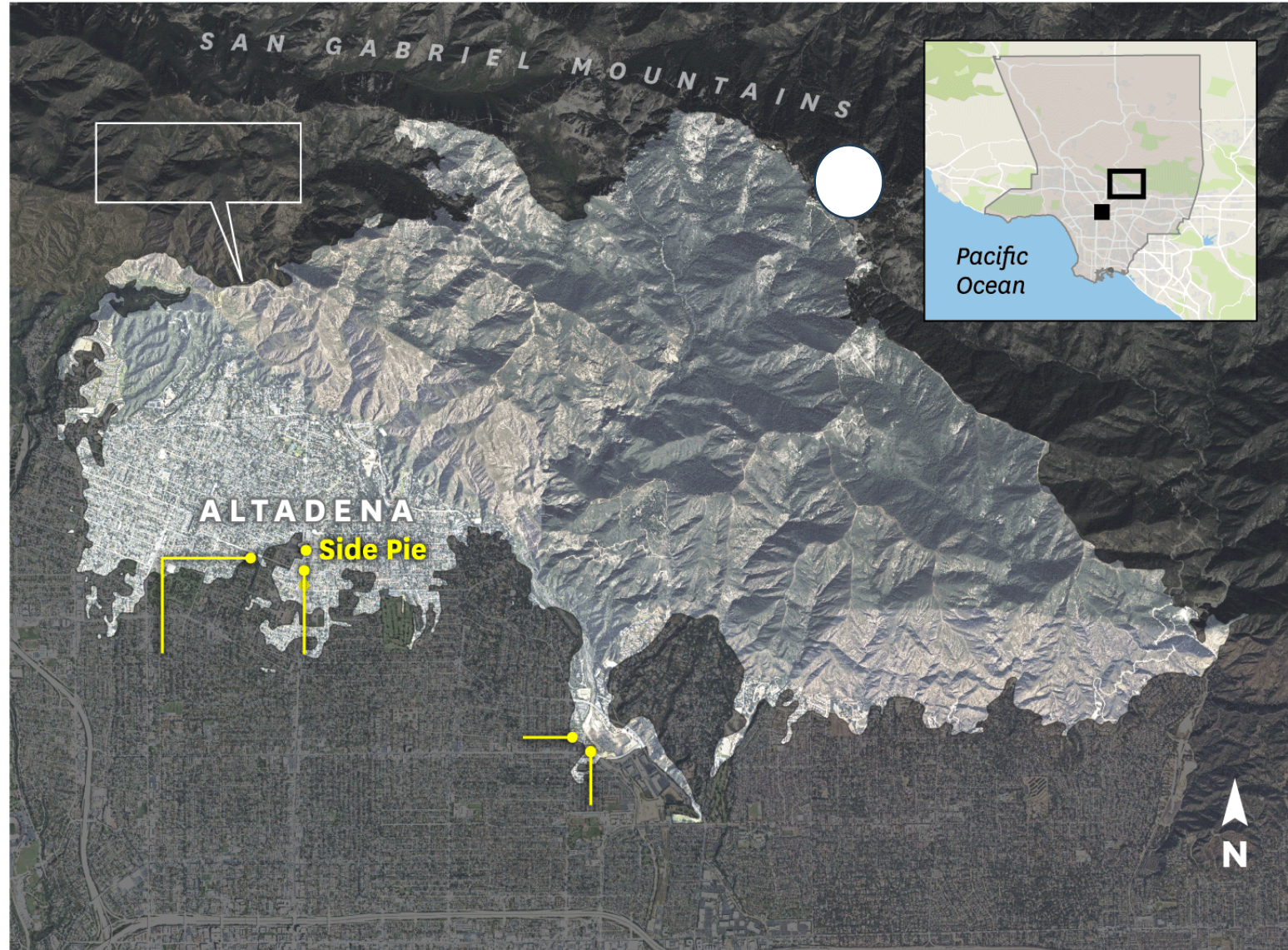
UNIVERSITY OF EXETER

Our key scientific partners

- *University of Michigan*
John Monnier
- *University of Exeter*
Stefan Kraus
- *Université Côte d'Azur*
Denis Mourard
- *Observatoire de Paris*
Vincent Coude du Foresto
- *Université de Limoges*
Ludovic Grossard
- *University of Sydney*
Peter Tuthill
- *Australian National University*
Mike Ireland
- *Kyoto Sangyo University*
Makoto Kishimoto
- *NSF's National Optical-Infrared Astronomy Laboratory (NOIRLab)*
Jayadev Rajagopal

2. Eaton Fire

- 2025 Jan 7
Hot Santa Ana winds spread fires into Altadena
- Jan 9
fires approached MWO; fire-fighters started fire break near antennas
- Jan 24
power back after weeks of fire operations at MWO
- Jan 26-27 10-inches snow









Kudos to CHARA and Mount Wilson Inst. staff

- Craig Woods
- Victor Castillo
- Larry Webster
- Caden Smith (MWI)
- Jesse Coker (MWI)





3. Staff News

- **Steve Golden** (20 year) retired from site management
- **Norm Vargas** (12 year) moved from telescope operator to assistant site manager
- **Heven Renteria** new telescope operator



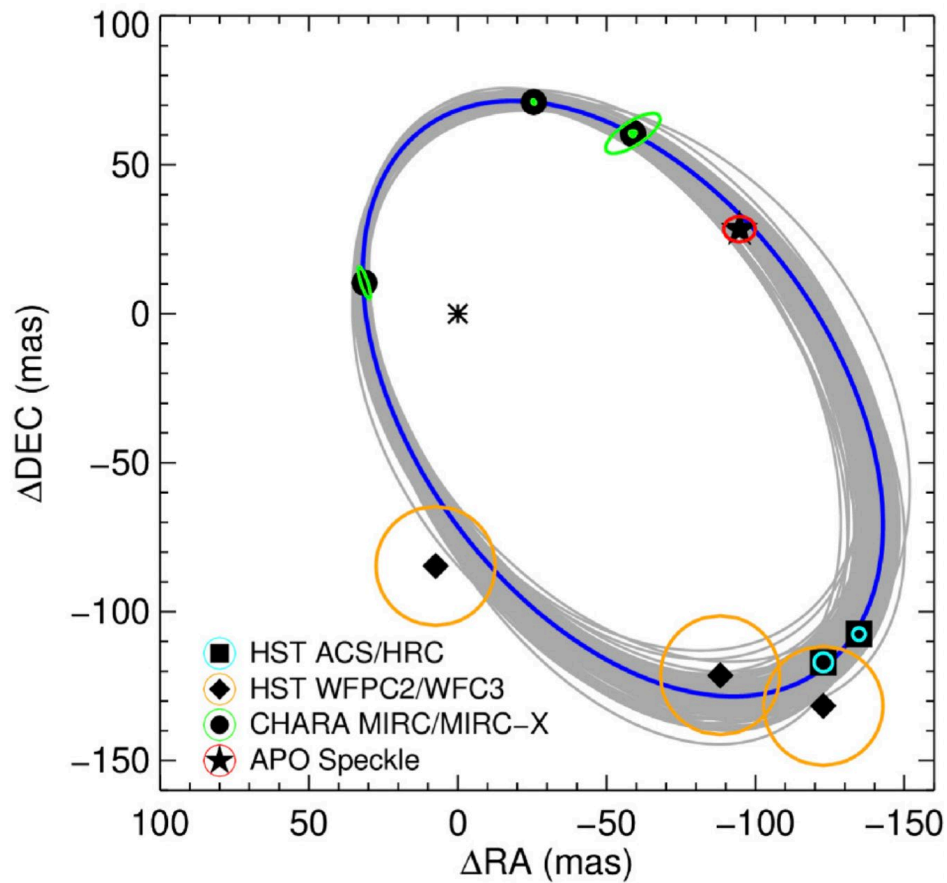


4. Science News

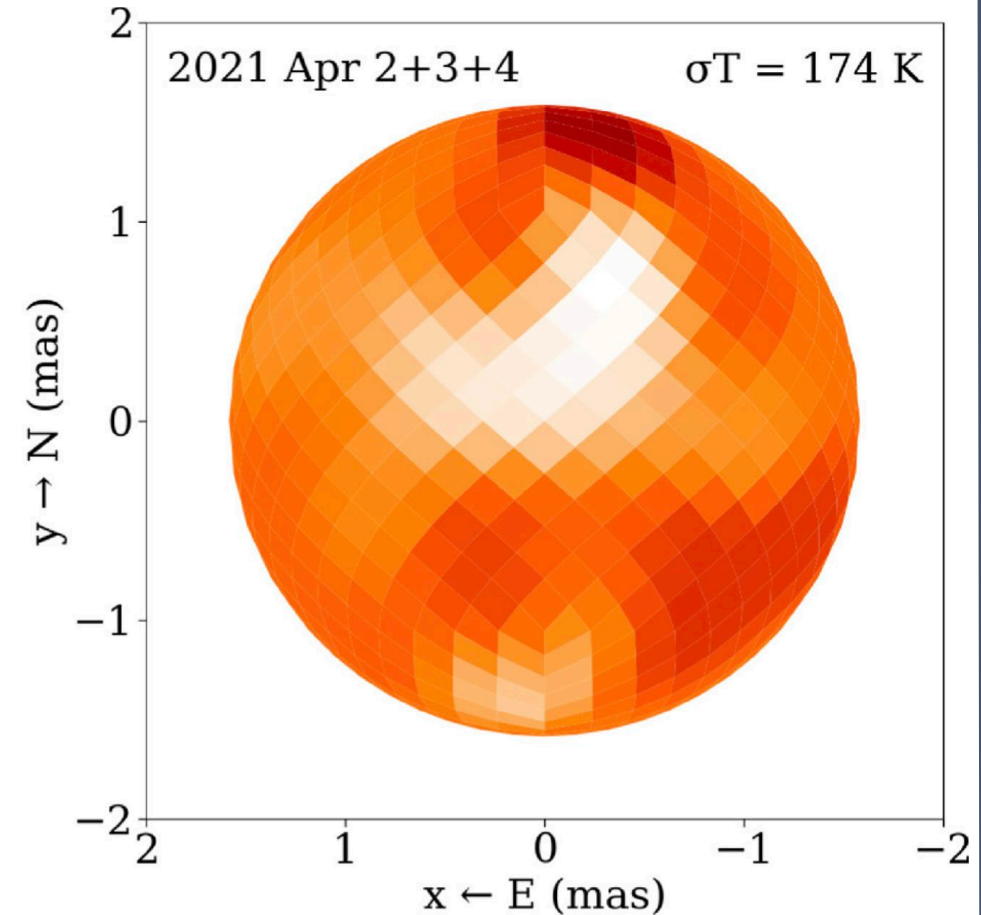
- 17 papers over last year
- total of 273 papers to date
- www.chara.gsu.edu/astronomers/journal-articles
- Topics include:
 - *stellar angular diameters and properties* [3]
 - *evolved stars and mass loss* [3]
 - *binary stars, stellar multiplicity* [10]
 - *techniques* [1]



The Orbit and Dynamical Mass of Polaris: Observations with the CHARA Array (Evans et al. 2024)

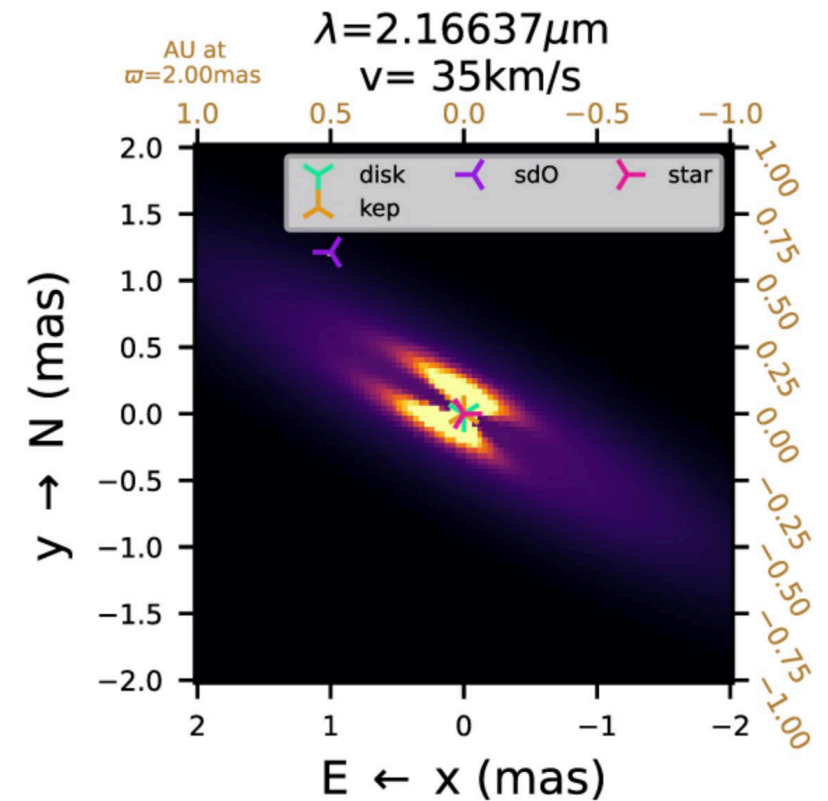
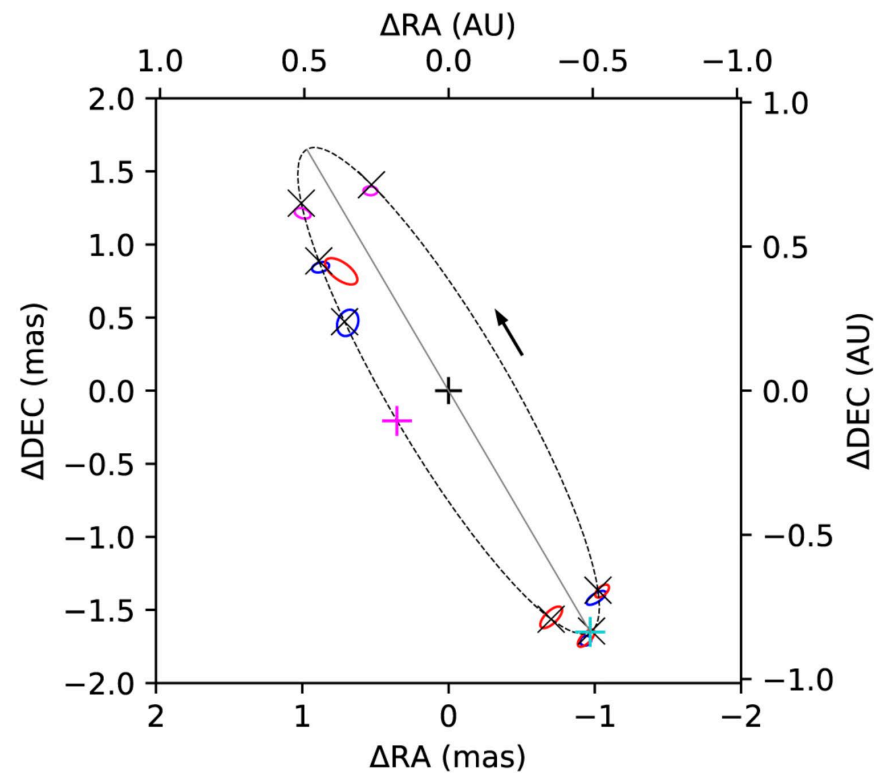


- 30 yr orbit and derived mass of $5.1 \pm 0.3 M_{\odot}$
- Faint companion $\Delta H = 7.8$ mag
- Surface spots





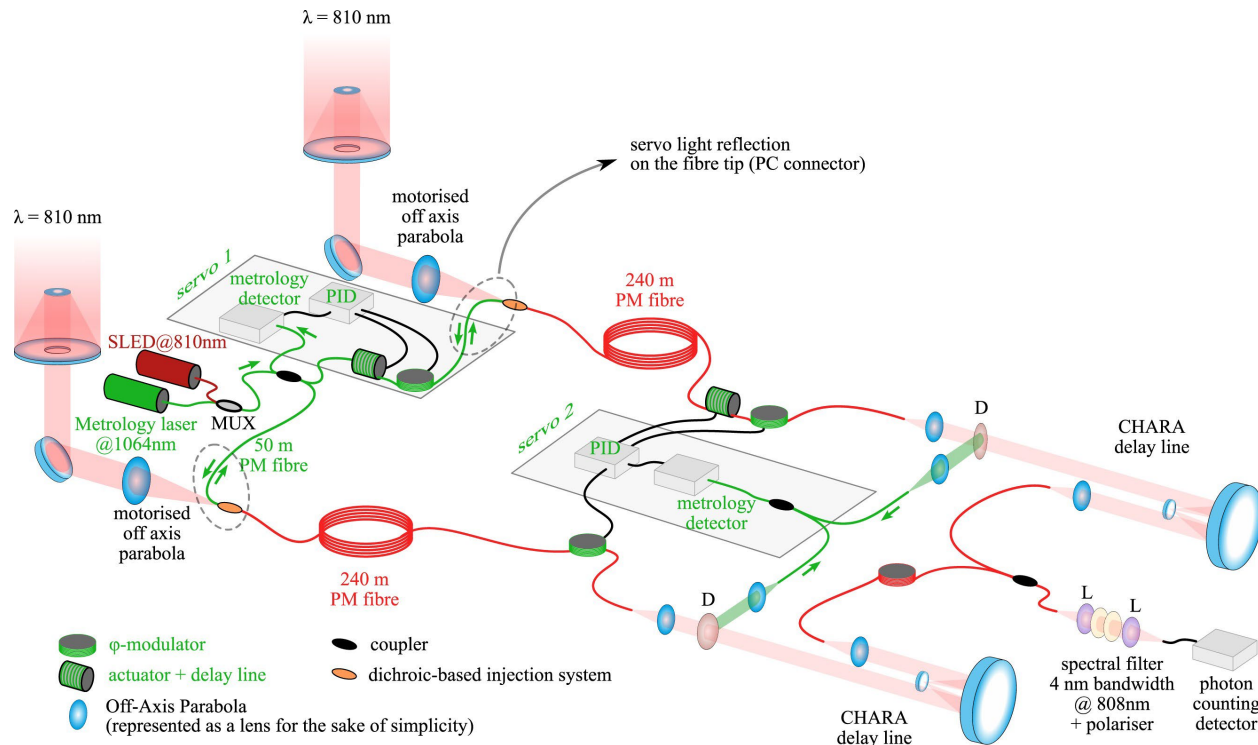
The CHARA Array Interferometric Program on the Multiplicity of Classical Be Stars: New Detections and Orbits of Stripped Subdwarf Companions (Klement et al. 2024)



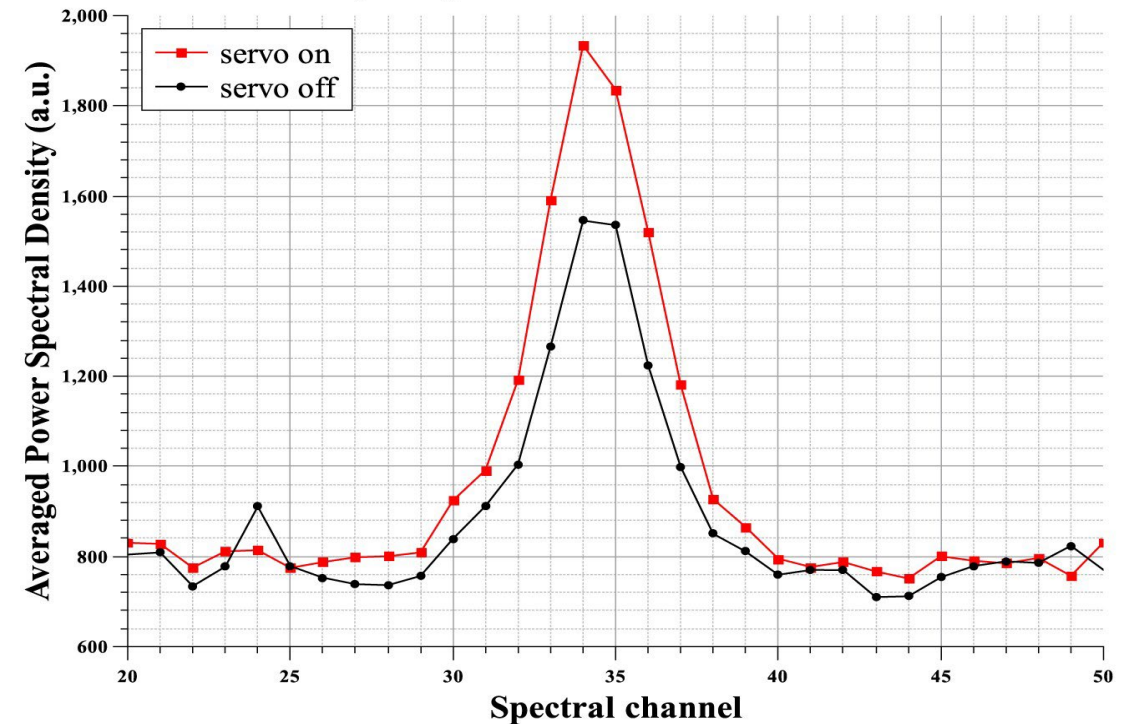
- Six orbits of Be+sdO systems
- HR2142: *VLTI/GRAVITY* detection of disk around sdO



First on-sky interference fringes at 810 nm with the CHARA Array using servo controlled hectometric outdoor fibre links (Magri et al. 2025) [ALOHA project, Univ. Limoges]



On-sky fringes - VEGA - 1000 frames of 0.2 s



- Fringes from the S1 and S2 telescopes using two 240 m fiber optics cables



5. Conclusions

- CHARA Array is now better than ever thanks to a year of major accomplishments
- Exciting time for new observational programs with improved beam combiners and mobile telescope/fiber optics experiments [talks ahead]
- CHARA continues to be a vehicle for innovation
- Grateful for the participation of scientists at this meeting; look forward to new partnerships, collaborations, initiatives



Special thanks to ...

Local Organizing Committee

- Isabelle Bailet
- Manon Bailleul
- Orlagh Creevey
- Romina Ibañez Bustos
- Juraj Jonák
- Anthony Meilland
- **Denis Mourard (chair)**
- Nicolas Nardetto
- Mathieu Vrad

Scientific Organizing Committee

- Orlagh Creevey
- Jeremy Jones
- Doug Gies
- Denis Mourard
- **Gail Schaefer (Chair)**

And

- CHARA Array staff
- U.S. National Science Foundation
- Georgia State University