

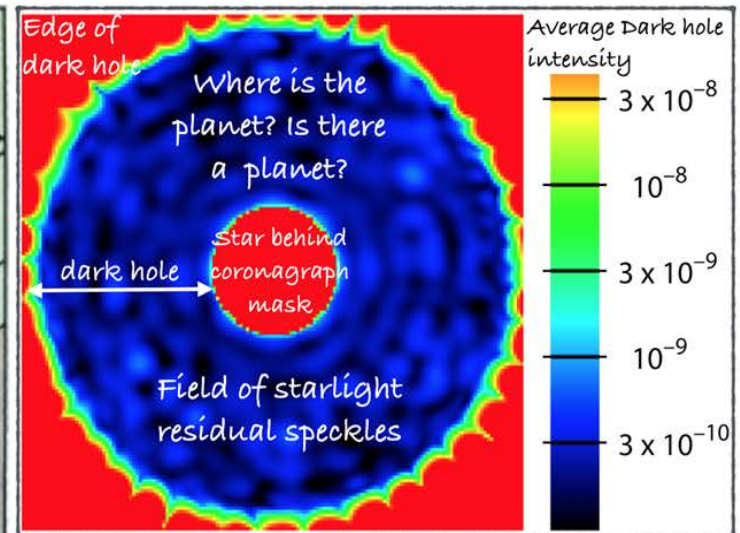
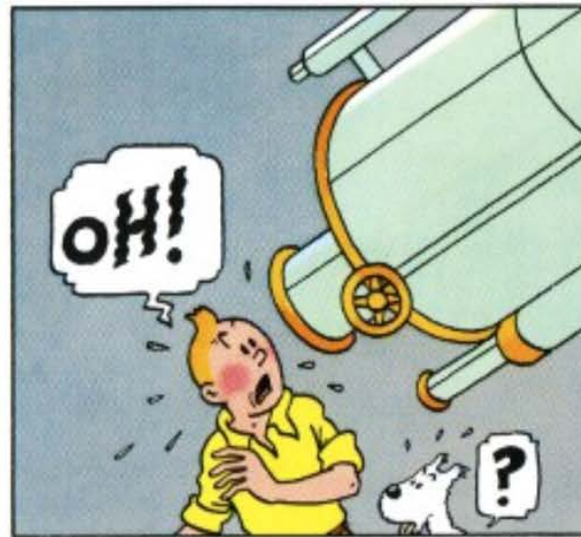


Keck Institute for Space Studies

Exoplanet Imaging and Characterization: Coherent Differential Imaging and Signal Detection Statistics Part II

What are we here for?

- Topical brainstorming in breakout groups
- Listen to a few talks to catch up on stuff
- Report planning and plans for advocacy



Schedule: breakout sessions are important

Monday, December 5, 2016 - Keck Center - Think Tank, Room 155		
Time	Event	Speaker
7:30 - 8:30	Institute open for free think time, Tolman/Bacher House rooms available	
8:30 - 9:00	Coffee and informal breakfast pastries / free think time continued	
9:00 - 9:45	Logistics / Introductions	Michele Judd
9:45 - 10:15	Recap from part I	Team leads
10:15 - 11:00	Objectives for part II	Team leads
11:00 - 11:30	Break	
11:30 - 12:30	Sensor Fusion (30 mins talk, 30 mins discussion)	AJ Riggs
12:30 - 2:00	Lunch at the Athenaeum	
2:00 - 3:00	Predictive Control (30 mins talk, 30 mins discussion)	J. Males
3:00 - 3:30	Plenary Discussion	All
3:30 - 4:00	Break	
4:00 - 5:00	Post-Processing, Machine Learning, Forward Modeling (30 mins talk, 30 mins discussion)	L. Pueyo Frazin
5:00 - 5:30	Solicitation of Lightning Talks	Team Leads
5:30 - 6:00	Pack up and walk to the Athenaeum	All
6:00	Dinner at the Athenaeum	

Tuesday December 6, 2016 - Keck Center - Think Tank, Room 155

Time	Event	Speaker
7:30 - 8:30	Institute open for free think time, Tolman/Bacher House rooms available	
8:30 - 9:00	Coffee and informal breakfast / free think time continued	
9:00 - 9:15	Logistics and Team Leads Update	Michele Judd Team Leads
9:15 - 10:15	DM technology + discussion (30 mins talk, 30 mins discussion)	P. Bierden
10:15 - 10:45	Break	
10:45 - 12:15	Determine breakout teams / begin breakout sessions	All
12:15 - 12:30	Group picture, walk to the Athenaeum	
12:30 - 2:00	Lunch at the Athenaeum	
2:00 - 3:30	Breakout sessions	Groups
3:30 - 4:00	Break	
4:00 - 5:00	Report from breakout sessions	All
5:00 - 6:00	Free think time	
6:00	No-Host Dinner at El Portal (postdocs and grad students covered by KISS)	

Wednesday, December 7, 2016 - Keck Center - Think Tank, Room 155

7:30 - 8:30	Institute open for free think time, Tolman/Bacher House rooms available	
8:30 - 9:00	Coffee and informal breakfast pastries / free think time continued	
9:00 - 9:15	Logistics and Team Lead Update	Michele Judd Team Leads
9:15 - 10:15	Lightning talks / or breakout session	TBD by participants
10:30 - 11:00	Break	
11:00 - 11:30	Plenary Discussion or Breakout session report outs	Groups
11:30 - 12:30	Millisecond Imaging (30 mins talk, 30 mins discussion)	R. Frazin Laurent
12:30 - 2:00	Lunch on your own / Free Time	
2:00 - 3:00	Breakout Session	Groups
3:00 - 3:45	Return to Plenary Session, Breakout Groups Report Out	All
3:45 - 4:15	Break	
4:15 - 5:15	Breakout Session	Groups
5:15 - 5:45	Plenary Discussion, selection of final breakout groups	All
6:00	Dinner at the Athenaeum with special guests	

Thursday, December 8, 2016 - Keck Center - Think Tank, Room 155

7:30 - 8:30	Institute open for free think time, Tolman/Bacher House rooms available	
8:30 - 9:00	Coffee and informal breakfast pastries / free think time continued	
9:00 - 9:15	Logistics and Team Lead Update	Michele Judd Team Leads
9:15 - 10:15	Breakout Session	TBD
10:15 - NOON	Outline of final report, writing assignments	All
NOON - 2:00	Lunch in Institute / free think time	
2:00 - 2:45	Plenary Discussion about next steps, outcomes and recommendations for the next 1-10 years	All
2:45 - 3:30	Final breakout (writing)	Groups
3:30 - 4:00	Break	
4:00 - 4:45	Final Plenary Discussion	All
4:45 - 5:00	Workshop Closeout	Michele Judd

Study Vision and Goals

- Mantra
 - KISS likes the big, new, outrageous ideas ...
 - Incremental stuff is, of course, good and is to captured in the workshop report
- We need a couple of big workshop goals

Recap: workshop I output

- AO at extreme contrast & IWA (6 votes)
- Goals/priorities list to get H2O detection at Prox Cen b (5.5 votes)
 - specific and practical
- Blueprint for imaging earth at 10 pc (3.5 votes)
- Fundable sales pitch (4.5 votes)
- Smart AO control: machine learning, control + post-processing (3 votes)
- Realistic coronagraph performance predictions at small WA (3 votes)
- Others: New facility, high R, LGS (3 votes)

Workshop I: Breakout groups

- Technology
- Telemetry, control, post-processing
- Signal statistics

Topics for the workshop (1)

- How to implement effective wavefront control in real instruments
 - Real-time or not
 - Focal plane / pupil plane?
 - What methods to use (SN, EFC, AFC)
 - What gains are to be had using a good Kalman filter?

Topics for this workshop (2)

- What new technologies should we be ingesting in a next generation AO-coronagraph
 - Detectors: Fast noiseless detectors such as MCT-APDs, MKIDs, EMCCDs
 - Deformable mirror technologies
 - High resolution spectrographs and spectral discrimination
 - LGS ExAO (?)
 - Other optics (polarization etc.)

Topics for this workshop (3)

- What gains can be made in the area of image post-processing
- Machine learning approaches
- How to acquire greater sophistication in image statistical analysis

Next generation planet imagers

- Performance goals
 - Contrast improvement: 10x
 - Inner working angle improvement: 3x
 - E.g. better LO WFC
- Science goals for next generation imagers
 - Image terrestrial planets around nearby low mass stars is an obvious challenge
 - Proxima Cen announcement came in the middle of the first meeting
 - How is this goal reachable?

Resources and Information Sharing

- Wiki site: you should know it by now
<https://kisscaltech-exoplanet.pbworks.com/w/home>
- Post group notes, work and member names
- List key questions addressed
- Upload papers and references
- Upload slides
 - Topical talks
 - Lightning talks
 - Group discussion summaries
 - Other slides

Exoplanet Imaging and Characterization

Summary

Files

Tasks

Members

Activity

Settings

Workspaces

Exoplanet Imaging and Charact...



Welcome to the
Exoplanet Imaging
and
Characterization
workspace.

This workshop seeks to address several questions related to the development of statistically grounded strategies for detecting faint signals in the presence of both coherent and incoherent backgrounds.

LINKS



➔ Keck Institute for Space
Studies

Overview

Exoplanet Imaging and Characterization: Coherent Differential Imaging and Signal Detection Statistics

Reference Articles and Learning Resources

Logistics

- [Phone numbers and email addresses for the Study organizers and KISS personnel](#)
- The URL for this Wiki is: <https://kisscaltech-exoplanet.pbworks.com/w/home>
- The URL for the public website is: http://kiss.caltech.edu/new_website/workshops/imaging/imaging.html

Workshop Attendee Information

- [Email List for Workshop Participants](#)

Need Help?

- If you are a wiki newbie, Michele recommends that you watch the [quick training video](#) to get an idea of how wikis work.
- [The PBworks Manual](#) can help show you how to edit, add videos and invite users.
- The best way to get your support questions answered is to **click the help link** at the top of this page. PBworks support gurus will get back to you asap.
- Learn what makes a good collaboration project and see how other PBworks customers are using their workspaces. Check out the [PBworks educator community](#) (not a support forum).

Changing E-mail Notifications

E-mail notifications are sent out when other users make changes to this wiki. You can choose whether you want to receive e-mails and the frequency. Here are [detailed instructions](#) on changing your preferences.

Purpose of Lightning talks

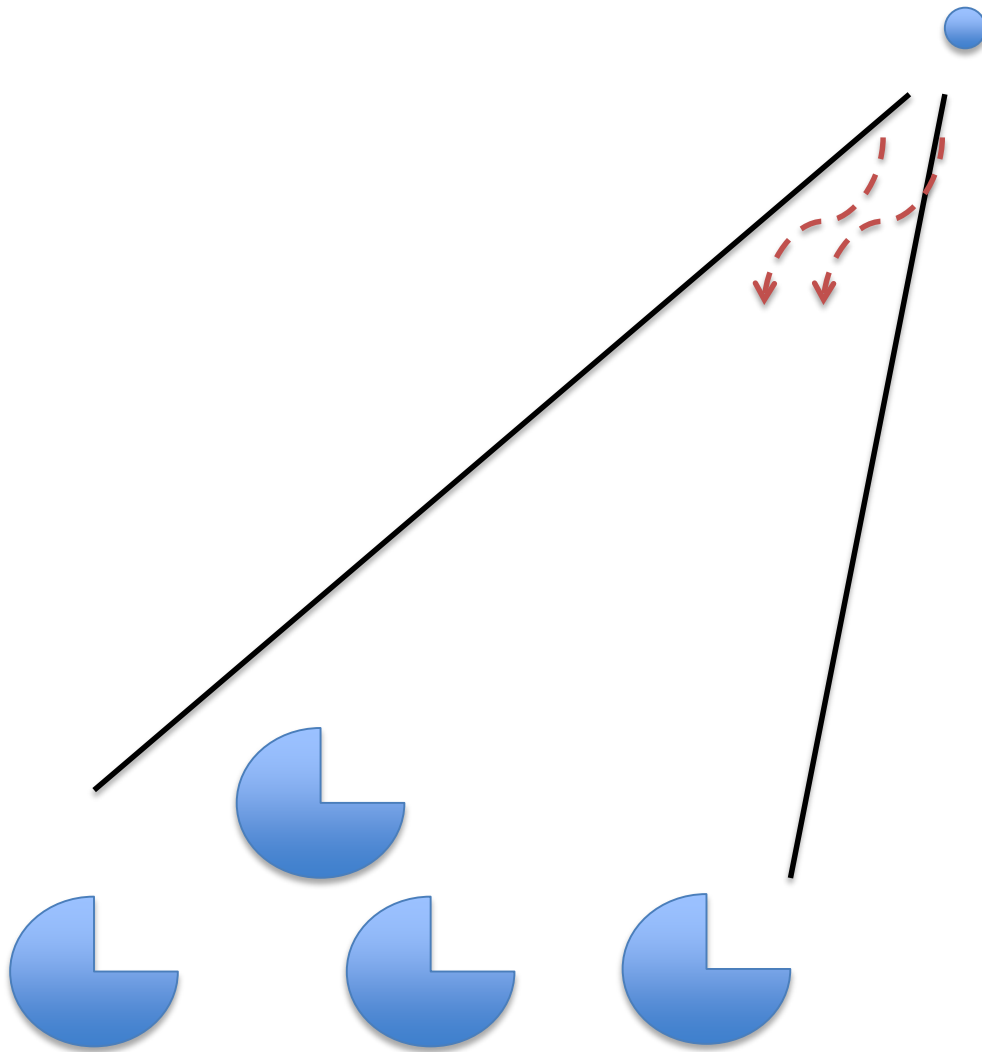
- Are there specific questions/topics that you feel have not been called out or sufficiently addressed?
 - Science
 - Technology
 - Mission related
 - Absolutely bonkers

Advocacy

- Formulate concrete ideas for advocacy
- Get ideas from workshop out to the community
 - Who is the community? Make a list
 - Working with a public organization
 - Or form our own advocacy organization like the Mars society or the Planetary society
 - Make collective push, not fragmented
 - Innovative ideas (private/high-network)
 - Needs a concrete plan and unity

Final Report

- Need an effective final report that captures both workshops well
 - Find a KISS report to rummage through
- Gets message from here out to community
 - Overarching themes, report outline, wkshop II notes
- MJ has funds for graphics done with a professional illustrator
- Ideas on post-workshop funding



Mazin's active illumination of planets
was inspired by Breakthrough starshot