AOWG Telecon: 09/16/05

Attendees: Max, Koo, Liu, Dekany, Matthews, Wizinowich, Chaffee, Marchis, Macintosh, Neyman

Agenda:

- Results from KPAO/MCAO/MOAO brainstorming
  Planetary (Marchis)
  Galactic (Macintosh)
  Extragalactic (Max)

- Planning for Keck Science Meeting strategic planning session (Max & Liu)
  AOWG 10-minute presentation
  Key questions for the audience

Next-gen AO science cases

--> AOWG (all): send input to Keck Forum web page before Keck Sci Meeting

Extragalactic discussion
Max: can MOAO be considered for expressly for imaging?
Dekany: usually think of MOAO as intimately tied to spectroscopy
(can always make images)
"spaxial" = spatial sampling of an IFU head
max spaxial size drives the optical design
tradeoff is then between FOV and pixel sampling
more interesting xgal science *not* for diffraction-limited sampling
~0.1" spaxials is better
Koo: high-SR in optical is big driver
may not have HST in ~5 years, thus need/enthusiasm for optical HST
*also 4x angular resolution --> ~4x farther for stellar pop studies*
4^3 = 64x larger sample available for study, in some sense
Max: laser technology is getting there - optical AO is no longer crazy
Koo: OSIRIS will only do a handful of objects over several years
  bring able to multiplex is a big gain
Matthews: high Strehl is key to sensitivity, more important than wide field

Galactic discussion
Macintosh: two broad areas of application
  1. crowded field - Gal Center, globular clusters ...
  2. high contrast - have done some quick calculations
     at 0.5", 10x better than Keck AO contrast
     planet detection: young embedded stars, low mass stars, brown dwarfs
Liu: MOAO, MCAO not so compelling
  proper motion study of Orion is good, but Gemini/MCAO will have big headstart
Planetary science

Marchis: KPAO is the most appealing capability, FOV is not a driver for solar system science even ~5" FOV is ok: e.g. want to see *local* dynamics of planet atm (don't need to see the whole planet - already have observed this)

Matthews: high Strehl much reduces the blending of surrounding stuff also significant S/N boost for many applications

Max: AO on Jupiter using same methods as solar AO may be possible

Marchis: optical AO is very appealing broad absorption at ~0.8-0.9 um due to hydrated materials better sensitivity to fragments/moonlets around TNOs & asteroids gives interal distribution of mass --> origin directly resolve TNOs & Trojans reconstruct the size & shape resolve surface composition going to ~7000 A would be very desireable * AO will happen much faster than new space probes *

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General discussion
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Dekany: if want shorter wl's, all that's needed is more $$$ to get more laser power short wl cutoff is key question to answer by science simulations show that PSF falls apart most quickly due lack of laser power e.g. fitting error (too few subapertures) falls apart less slowly

Dekany: resolution with a single LGS is different than a multiple LGS system single system: resolution never reaches diff limit multiple laser: can overcome this problem

Chaffee: would like to get the community so excited that they are clamoring for AO generate a "chorus" that AO is one of most important things for Keck's future

Max: would like to start a discussion of "narrow field" vs "wide field" among community Chaffee: are these two approaches exclusive? Dekany: no. think about KPAO as just delivering a wide-field. Neyman: can design KPAO smartly so can go down either MCAO or MOAO path and could still be used in high Strehl & in the visible laser cost is a big driver, could be bought incrementally

Wizinowich: "KPAO-120" and "KPAO-90" concepts

Wizinowich: we need a Science Team and a Project Scientist !!