

**NGAO IWG
Some Science Case Questions**

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Asteroids

Asteroids finite size, will be resolved, so can't simply block with a mask. Differential imaging may be a solution, using color or polarization. Should discuss polarimetry issues further with Ireland, Perrin.

Only one with need for low spectral res. with IFU. Don't need to spatially resolve spectra for central asteroid? Use seeing limited spectroscopy, observe rotating asteroid to detect non-homogeneity? Companions, won't be resolved, just need colors?

Planets Around Low Mass Stars

High contrast, near-IR imaging, down to 900 nm, could accept lower cutoff. 5" field, what static errors do you have to get rid of to do the needed contrast? Need 10^6 , only 10 fold improvement over current Keck AO?

Debris disk work, what is the relationship of this to the $R = 100$ IFU ("low performance GPI")?

Protostellar Objects

Herbig AB stars, differential polarimetry, one of the strongest cases for differential polarimetry. Might need larger FOV?

Debris Disks

Would this use an IFU?

Galactic Center

Galactic center, possible driver of spectral resolution to greater than 4,000 is need for RV precision. Currently at 20 km/s want 10 km/s. What else might be done to improve RV precision, otherwise we need $R \sim 15,000$ for GC science? J & H band with better Strehl, does that help?

Higher sensitivity might eliminate need to use He stars?

Resolved Stellar Populations

Confusion limited vs. resolved stellar populations, are the different requirements for IFU FOV and sampling?

Is there a case for a visible deployable IFU?



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Nearby AGNs

What are wavelength ranges of long slit observations to determine overall galaxy dynamics?

One near IR IFU selectable plate scales, several arc seconds in each direction might work. Why not use a seeing limited IFU for this?

PSF variability gets complaints in near-IR, what we have now, this will be what we have in the visible with NGAO? So how useful will that be?

QSO Host Galaxies

Small FOV, need to get rid of core light source. Does a coronagraph work?

Not sure of near-IR IFU, R ~4,000 would be okay?

Gravitational Lensing

Deployable imaging and spectroscopy?

Near-IR deployable IFU and imager emphasized. Not clear what you would get from visible imaging, but most of work done to date has been in visible with HST.

High Z Galaxies

Prefer BB spectral mode, 1" x 3" FOV, 50 mas spaxels, R ~3,000 or more. Background goal of not more than 10% to 20% over telescope + sky, need to set upper limit on background as this is a technical trade space issue.

L&M band, is there a need?

Other Issues

Visible Wavelength AO

Visible wavelengths as a compliment to IR observations, will this open up investigations, like HST observations have done? How does the Strehl vs. diffraction limit trade work?

Visible AO will require a different observational planning approach? Among other things detector readouts will be much longer than current IR readout times.

Near-IR and Visible Imagers

One plate scale? Nyquist or Nyquist/2 sampling? Nyquist/2 would have 10" FOV with 4K detector. Nyquist/2 may be needed for PSF modeling and de-convolution.

Other applications for deployable imaging?