

## *Questions, Comments and Answers following the presentation*

### *Astrometry in MCAO imaging*

Pascale Hibon

Ramsay: Are the reported astrometric errors from GMOS relative or absolute? If absolute, what was the reference?

They are absolute astrometric error, using HST images for references.

Masciadri: Concerning the variability of the PSF, what has already been done to identify the sources of these variability?

The PSF is dependent on the position in the field AND on the geometry of the guide star constellation (plus higher order terms such as laser power and return, relative brightness of the guide star.)

Rantakyro: Comments:

1. Almost as critical as seeing is the sodium layer return. Higher return allows faster corrections and thus performance depends on seeing (Cn2) + sodium return.
2. The probability for the GMOS+CANOPUS probably is on the 30-40% range.

Girard: With all the NIR experience GEMS+GSAOI, could you (the team) check performances against predictions (simulations) with different asterism of NGS (3 or 2)? and also translate that into performances that you would get in the visible with GMOS for example, (i.e., GMOS spectroscopy with  $\sim 70$  mas PSF)?

In the case of GeMS+GMOS, we have compared the performance for 2 different NGS asterisms of 3 stars. This is described in the GeMS+GMOS referred paper. There are also data available with only 2 stars. The NGS constellation is a critical factor on the performance. I am sure that the performances have been checked against predictions for GeMS+GSAOI but I do not have the information.

Rutten: GEMS/GMOS is not foreseen to be used in the foreseeable future for optical spectroscopy but we do have plans for use with MOS in the near IR using Flamigos-2.

Some preliminary tests, done to check if it was feasible to use one of the spectroscopic modes of GMOS with GeMS have been quickly done. However, it is not part of the project lists for the Gemini observatory to pursue this instrument combination nor to offer it in a near future to the user community.

Mouillet: Distortion: is the origin identified, understood?

We know that there is a time variation distortion (i.e. dynamic distortion). There is also an instrumental distortion. This is still under some investigation to make sure it is well understood and quantified.

Lupton: How often is CN2 nice for GLAO (confined to first 300 m?) or MCAO (2 layers, one ~300 m, one high)

Very good question for which I do not have the answer. It will need to be verified.

Osip: Opening from astrometry, you stated a photometric limit in MCAO of 5-10% and listed several contributors. Can you specify the priority of these contributions?

The 5-10% limitation mentioned is mostly due to the combination of two factors: 1- the permitted observing area above the telescope, and 2- the limiting magnitude of the NGS ( $R \sim 15$  mag). To remedy to the limitation due to the NGS magnitude, an upgrade of the NGS wavefront sensor has been planned. This will push the magnitude limit up to 17 (goal: 17.5), and will dramatically improve the GeMS sky coverage as well as its performances.