

20 years of adaptive optics at ESO -- 27 november 2009

Opening address

It is a pleasure to welcome you to ESO to this special workshop organized by Norbert Hubin to mark and celebrate an important milestone, namely 20 years of adaptive optics developments at ESO.

The history of the telescope shows a steady increase in mirror diameter, driven by the desire for increased sensitivity and angular resolution. But the angular resolution is severely degraded by the atmospheric turbulence which has a characteristic timescale measured in milliseconds.

The technology to correct for this fast blurring became available in the past decades, and certainly in the United States had the full attention of the military, from which also astronomy benefited, albeit with some delay. At ESO the introduction of adaptive optics started now twenty years ago on La Silla, just prior to the launch of Hubble.

It is fair to say that Hubble even today has no peer in the optical as far as stability of the Point Spread Function and the size of the field of view. However, it is impressive to see how the ground is steadily catching up, for sure in the near-infrared. NACO and SINFONI (with the laser guide star) are common-user instruments, SPHERE will be another one relying on extreme Adaptive Optics to look for exoplanets. And the VLTI is likely to get its own MACAO's. The technology demonstrator MAD has indeed shown that Multi-conjugate Adaptive Optics works, reaching the diffraction limit with good Strehl ratio over a two by two arc minute field of view, comparable to that of the Hubble cameras, but with more sensitivity. And all of this long-term program in good collaboration with institutes in the Member States, as today's set of participants demonstrates. This is a major strength, and is one of the reasons why the US community is starting to realize they may no longer be able to compete.

Looking towards the future, the Adaptive Optics Facility is well on the way and will, if all goes well, allow superior diffraction-limited imaging and spectroscopy on UT4. It is also a key milestone on the way to the E-ELT which will have adaptive optics built-into the telescope. I hope to bring the construction proposal to Council one year from now.

Today's program chronicles this entire development, with a good mix of technology and science, and I believe it will be an interesting and exciting day.