What the European Southern Observatory has to offer and how you can use it

Daniel Asmus
ESO, Chile & University of Southampton
“ESO is the pre-eminent intergovernmental science and technology organisation in astronomy. It carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilities for astronomy to enable important scientific discoveries.”
Argentina

Santiago (400km)

since 1966

since 1998

since 2005

since 2011

2024?
Users of any professional background, nationality or affiliation may submit an ALMA proposal (call yearly, deadline in April).

- 66 antenna interferometer
- 0.32 to 3.6 mm,
- 0.018” to 3.4” angular resolution

See separate call
VLT/I Instruments
VISTA
(Visible and Infrared Survey Telescope for Astronomy)

VIRCAM
(VISTA InfraRed CAMera)

VST
(VLT Survey Telescope)

OmegaCAM

Credit: M. Claro/ESO
VISTA
(Visible and Infrared Survey Telescope for Astronomy)

VIRCAM
(VISTA InfraRed CAMera)

VST
(VLT Survey Telescope)

OmegaCAM

Credit: M. Claro/ESO
3.6-metre telescope

HARPS (High Accuracy Radial velocity Planet Searcher)

NTT (New Technology Telescope)

EFOSC2 (ESO Faint Object SpeCtrograph 2)

SOFI (Son OF Isaac)

ULTRACAM
APEX (Atacama Pathfinder EXperiment)

LAPOCA
(Large Apex BOlometer CAmera)

SEPIA
(Swedish ESO PI receiver for Apex)

PI230
(A 230 GHz receiver for APEX)

ArTéMiS
(Architectures de bolomètres pour des Télescopes à grand champ de vue dans le domaine sub-Millimétrique au Sol)
How to make use of ESO?
This query interface allows to search and to request raw observational data taken by telescopes of the La Silla Paranal Observatory. At request time the user can decide whether raw or processed calibrations needed to process the selected raw science data should also be delivered.

To search through the raw frames querying by instrument-specific parameters, please use the Instrument-specific Interfaces link above. To search for reduced Data Products, including public surveys and pipeline-reduced and quality-controlled science-ready data, please have a look at the generic data products query form. A list of other retrievable advanced data products is available.

Checkboxes on the right of the parameters' names define whether or not the relative parameters will be displayed in the query result page; checkboxes on the left of the parameters' values are used to constrain the query on those values.
Observing Proposals
Call for proposal twice per year
(deadlines end of March & September)

• Document with all relevant info appears ~< 1 month before

• Everyone can apply

• Service mode or Visitor mode for Paranal; La Silla only visitor mode (3+ nights minimum); APEX only service mode

• Travel support but only for member state affiliated

Top Tip: Start at least 1 month in advance with the preparation
What telescope/instrument do I need for my science goal?

What can I learn with telescope/instrument X for my science?

Is it feasible???

Has something similar been done before?

Who can help me?

What kind of proposal do I need to write?

What is needed?
ESO Call for Proposals — P101
Proposal Deadline: 28 September 2017, 12:00 noon CEST
I Phase 1 Instructions

1 ESO Proposals Invited
1.1 Important recent changes (since Periods 99 and 100) ........................................
1.2 Important reminders .................................................................
1.3 Foreseen changes in the upcoming Periods ........................................

2 Getting Started
2.1 Exposure Time Calculators ............................................................
2.2 The ESOFORM proposal package ..................................................
   2.2.1 ESOFORM: Important notes .................................................
2.3 Proposal Submission .................................................................
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   2.1 Exposure Time Calculators
   2.2 The ESOFORM proposal package
      2.2.1 ESOFORM: Important notes
   2.3 Proposal Submission
4 Proposal Types

4.1 Normal Programmes
4.2 Monitoring Programmes
4.3 Large Programmes
4.4 Target of Opportunity
   4.4.1 ToO using the Rapid Response Mode (RRM) system
4.5 Guaranteed Time Observations
4.6 Proposals for Calibration Programmes
4.7 Director’s Discretionary Time
4.8 Host State Proposals
4.9 Non-Member State Proposals
4.10 VLT-XMM proposals
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Additional important/helpful information on the website
Getting time is not easy!
Sometimes one can optimise chances by choosing the right instrument and targets...
APPLICATION FOR OBSERVING TIME

PERIOD: 99A

Important Notice:
By submitting this proposal, the PI takes full responsibility for the content of the proposal, in particular with regard to the names of Cols and the agreement to act according to the ESO policy and regulations, should observing time be granted.

1. Title
   Are powerful polar dusty winds ubiquitous in AGN?

2. Abstract / Total Time Requested
   Total Amount of Time: 0 nights VM, 19.2 hours SM
   The field of active galactic nuclei (AGN) research is now facing the possibility of a paradigm change. The key ingredient of AGN unification, the dusty obscuring torus was so far held responsible for the observed mid-infrared (MIR) emission but recent studies of those objects with the best data show that instead a powerful polar dusty wind is dominating these wavelengths, leaving little room for the torus emission. But is this wind really ubiquitous? The current results make the clear prediction that all objects with a sufficiently inclined line of sight (type 2 AGN) and bright [OIV] emission should have detectable polar MIR emission, whereas the [OIV] is tracing how powerful the AGN and pronounced the ionisation cones are. Here we propose to the the ubiquity of this polar MIR emission with a straightforward detection experiment using the upgraded capabilities of VISIR.
## Application for Observing Time

### Period: 99A

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### Title

Are powerful polar dusty winds ubiquitous in AGN?

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**Interesting title?!**

**Write a concise and interesting abstract**
Interesting title?!

Imagine you are the referee after reading already 20+ other proposals...

Write a concise and interesting abstract

Iterate it several times. The abstract is critical!!
Which ambient conditions do you need? This can decide whether you are scheduled or not!!! (Revise values at the end)

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<thead>
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<th>Run</th>
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4. Number of nights/hours
   a) already awarded to this project:
   b) still required to complete this project:

5. Special remarks:
   Use this box to highlight some important/special aspect of the programme (e.g., this is a resubmission of a scheduled but not executed programme).

6. Principal Investigator: Daniel Asmus, dasmus@eso.org, ESO, ESO Office Santiago

6a. Co-investigators: Do you have the right Co-Is to pull this one off?!!
Here comes the meat. What exactly do you want to do? And why?

Short introduction with relevant literature

The Problem...

The idea!

What exactly do you want to do?

What goals and how reached?

Comparison with models?

But be specific!

How is this relevant for the wider field?

Be smart with the plot arrangement

A - Scientific Rationale:

A new emerging paradigm for active galactic nuclei? It seems beyond doubt that active galactic nuclei (AGN) contain large amounts of dust which is heated by the accretion onto the supermassive black hole, leading to copious amounts of mid-infrared (MIR) emission, which in fact contains roughly half of the...
Describe clearly which instrument mode you want to use and how you arrived at the requirements for time and conditions.

Are you sure you understand all technical aspects? Maybe better consult an expert...
Summary Important Advice:

- Read the Call for Proposals!
- Read the instrument manual!
- Have a clear, well-defined science goal
- Demonstrate how the observations will allow you to reach your goal
- Explain very clearly your sample selection
- Write a concise and interesting abstract, iterate it several times — it is the most important single paragraph in the proposal
- Demonstrate that your team will be able to reduce/analyse the data
- Include one or two clear and optimised figures that are easy to read and understand, supporting your case
- Describe clearly which instrument mode want to use and how you arrived at the requirements for time and conditions
- Check if similar data already exists, and if yes, explain concisely why new ones are needed

*If you don’t get through the first time(s), don’t give up! Try again!*
Working at ESO
• Visiting
  • Contact (potential) collaborator at ESO

• Studentship
  • Call for applications twice every year (May 31 & Nov 15)
  • Identify and contact potential supervisor way in advance
  • Up to 2 years at ESO (Chile or Germany), return to home institution for finishing
  • Up to 6 positions at each site per year

• Fellow
  • Call for applications every year (deadline Oct 15)
  • 3 years in Garching with 25% duties OR 3 years in Chile with 80 nights duty (choose Paranal or ALMA) + 1 at member state with 0% duties
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Everyone can apply!!!

Get in touch!
FOcal Reducer and low dispersion Spectrograph

- **Wavelength**: 0.3 to 1.1 micron (UV, visible)
- **Modes**: imaging, longslit spectroscopy, multi object spectroscopy, polarimetry, spectropolarimetry, high-time resolution
- **Angular resolution**: seeing-limited (> 0.4 arcsec)
- **Field of view**: 6.8 x 6.8 arcmin or 4.3 x 4.3 arcmin
- **Spectral resolution**: 260 to 2600
- **Sensitivity**: ~27th mag (imaging), 24th mag (spectroscopy)
Nasmyth Adaptive Optics System
Near-Infrared Camera and Spectrograph

- **Wavelength:** 1.0 to 4.0 micron (J H K L)

- **Modes:** Imaging (adaptive optics, noAO), Coronagraphy, Polarimetry, sparse aperture masking, burst

- **Angular resolution:** ~0.03 arcsec with adaptive optics (off-axis possible)

- **Field of view:** 56 x 56 to 14 x 14 arcsec

- **Spectral resolution:** —

- **Sensitivity:** ~24th mag, (18.6 in L-band)
VISIR

Vlt Imager & Spectrograph for the InfraRed

- **Wavelength:** 5 (M), 7-13 (N), 16-21 (Q) micron
- **Modes:** imaging, burst, coronagraphy, sparse aperture masking, low and high resolution long-slit spectroscopy, cross-dispersed high-resolution spectroscopy
- **Angular resolution:** down to 0.2 arcsec
- **Field of view:** 38 x 38 arcsec
- **Spectral resolution:** ~200 and ~20000
- **Sensitivity:** 9th mag (imaging), 7th mag (LR spectroscopy), 3rd mag (HR spectroscopy)
SINFONI Spectrograph for INtegral Field Observations in the Near Infrared

- **Wavelength:** 1.1 to 2.5 micron (J, H, K)
- **Modes:** medium resolution integral field spectroscopy (64 x 32 spaxels)
- **Angular resolution:** ~0.05 arcsec with adaptive optics (off-axis possible)
- **Field of view:** 8 x 8, 3 x 3 or 0.8 x 0.8 arcsec
- **Spectral resolution:** 1500 to 4000
- **Sensitivity:** ~20th mag
K-band Multi Object Spectrograph

- **Wavelength**: 0.8 to 2.5 micron (visible, J, H, K)
- **Modes**: medium resolution integral field spectroscopy (14 x 14 spaxels times 24 arms)
- **Angular resolution**: seeing limited (> 0.3 arcsec)
- **Field of view**: 7.2 arcmin & 2.8 x 2.8 arcsec
- **Spectral resolution**: 2000 to 4200
- **Sensitivity**: ~20th mag
MultiUnit Spectroscopic Explorer

- **Wavelength:** 0.5 to 0.9 micron (visible)
- **Modes:** medium resolution integral field spectroscopy (1024 x 1024 spaxels)
- **Angular resolution:** seeing-limited (> 0.4 arcsec; but adaptive optics in a few years)
- **Field of view:** 1 x 1 arcmin
- **Spectral resolution:** 1800 to 3600
- **Sensitivity:** ~23th mag
Visible MultiObject Spectrograph

- **Wavelength**: 0.36 to 1.0 micron (UV, visible)

- **Modes**: imaging, multi-object medium resolution spectroscopy, integral field medium resolution spectroscopy

- **Angular resolution**: seeing-limited (> 0.4 arcsec)

- **Field of view**: 4 x 7 x 8 arcmin (imaging & MOS), 13 x 13 to 56 x 56 arcsec (IFU, 6400 fibers of 0.33 to 0.67 arcsec)

- **Spectral resolution**: 200 to 3100

- **Sensitivity**: ~27th mag (imaging)
Multiwavelength spectrograph

- **Wavelength:** 0.3 to 2.5 micron (UV, visible, J, H, K)
- **Modes:** medium resolution spectroscopy, integral field spectroscopy
- **Angular resolution:** seeing-limited (> 0.3 arcsec)
- **Field of view:** 11 arcsec (slit length) or 1.8 x 4 arcsec (IFU)
- **Spectral resolution:** 3000 to 18000
- **Sensitivity:** ~21th mag
UVES

Ultraviolet & Visible Echelle Spectrograph

- **Wavelength:** 0.3 to 1.1 micron (UV, visible)
- **Modes:** cross-dispersed high resolution spectroscopy
- **Angular resolution:** seeing-limited (> 0.4 arcsec)
- **Field of view:** 10 arcsec (slit length)
- **Spectral resolution:** 40000 to 110000
- **Sensitivity:** ~19th mag
Other instruments:

**Current:**
- FLAMES (visible MOS/IFU),
- HAWKI (NIR widefield imager),
- SPHERE (vis/NIR extreme AO imager/polarimeter)
- VLTI/PIONIER and AMBER (NIR interferometer)
- VISTA/VIRCAM (NIR widefield imager on 4m)
- VST/OMEGACAM (visible widefield imager on 2m)

**Future:**
- VLTI/Gravity (NIR interferometer)
- VLTI/MATISSE (mid-infrared interferometer)
- CRIRES (1 to 5 micron high resolution AO spectrograph)
- AO upgrades for MUSE and HAWKI
- ESPRESSO (high-res spectrograph)