
cnrs
dépasser les frontières
THEMIS 2022
Baseline instrumentation offer

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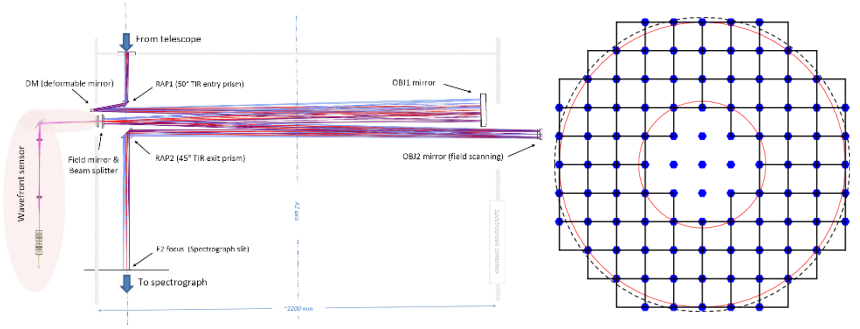
- **Adaptive optics TAO v1.0 operational**
  - 1kHz on solar granulation and sunspots (with real-time WFS camera server)
  - 200Hz on Mercury and m=0 stars
  - Will evolve to v1.5 (1.4 kHz, better UI, real-time servers for all features)
- Long slit spectrograph (MTR2)
  - 2 -> 3 simultaneous spectral ranges (400-900 nm)
  - **New 2k cameras: 0.06 or 0.12 "/px** spatial (without/with polarimetry), 4 mA/px spectral
- Broad band imager (BBI)
  - Selectable broadband within 400-900 nm
  - 1' or 2 ' fov on a 2k camera
- BBI and MTR2 **exclusive or simultaneous** (20 / 80 beamsplitter)

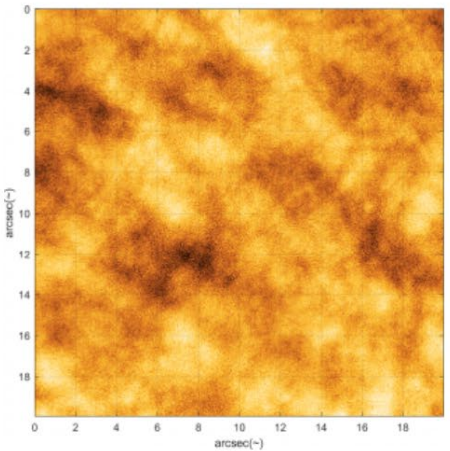
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824135.

THEMIS adaptive optics

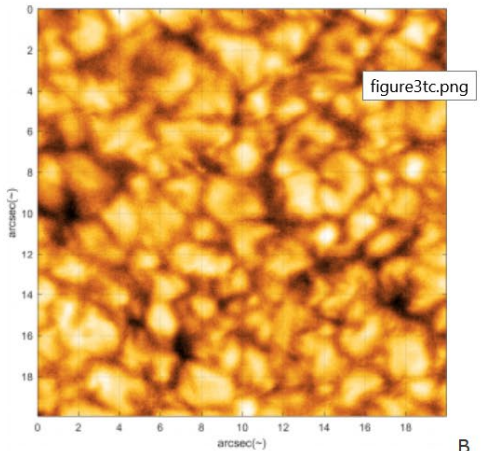
- TAO (Themis Adaptive Optics) v1.0 is operational (1st light Dec 2020)
- Classical solar AO hardware currently running at 1 kHz and combining a Shack-Hartmann wavefront sensor with 76 subapertures (10×10 geometry) and a deformable mirror DM97 from ALPAO with 97 actuators.



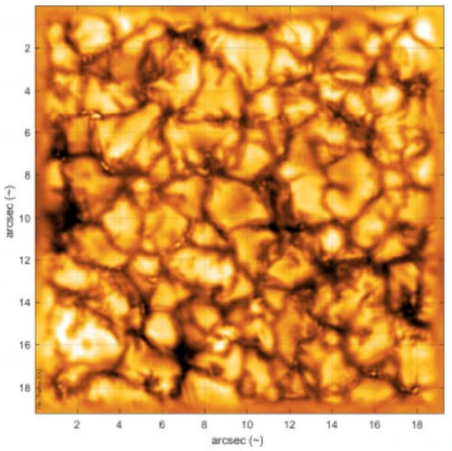
- **AO off** (seeing "daytime bad")
- $r_0 \approx 3 - 4$ cm
- Granulation contrast: **1.65%**



- **AO on** (seeing "daytime bad")
- $r_0 \approx 3 - 4$ cm
- Granulation contrast: **4.2%**



- **AO on** (seeing "daytime bad")
- Knox-Thompson reconstruction (100 frames)
- Granulation contrast: **9.6 %**



THEMIS 2022(+) technical developments

- TAO v1.5: 1.4 kHz, better UI, real-time servers for all features (2022)
  - V 1.0 is “production version”, always available
- Dual beam polarimetry at the telescope (2022)
  - Permanent polarimetric analyzer @F1
  - Switchable output for polar / non polar config

- “IFU mode” project (-> 2023 / 24)
  - IAC driven collaboration
  - Adapt the long slit spectrograph to a 6”x 6” fov in a single shot
  - Similar in concept to GREGOR IFU

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ACCESS delivered and expectations

- 2019: 14d ~~2020~~ (2021): 16d (total 30 delivered end of 2021)
- **2022**
  - **60 to 75 days** campaign offer (150d with technical time)
  - France (40d ?) + CCI ITP (?) + Solarnet community (15d -> 20d ?)
  - from 2022 Apr 15th to Sep. 30th
  - BBI + nopolar long slit spectrograph
  - Polarimetric mode for commissioning / shared risk proposals starting in june 2022
  - Expectation is: **15-20 of ACCESS** application

- Probable final undersubscription of Solarnet Access (~50 / 80 end)
  - Unless some 2023 contract extension (?)

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