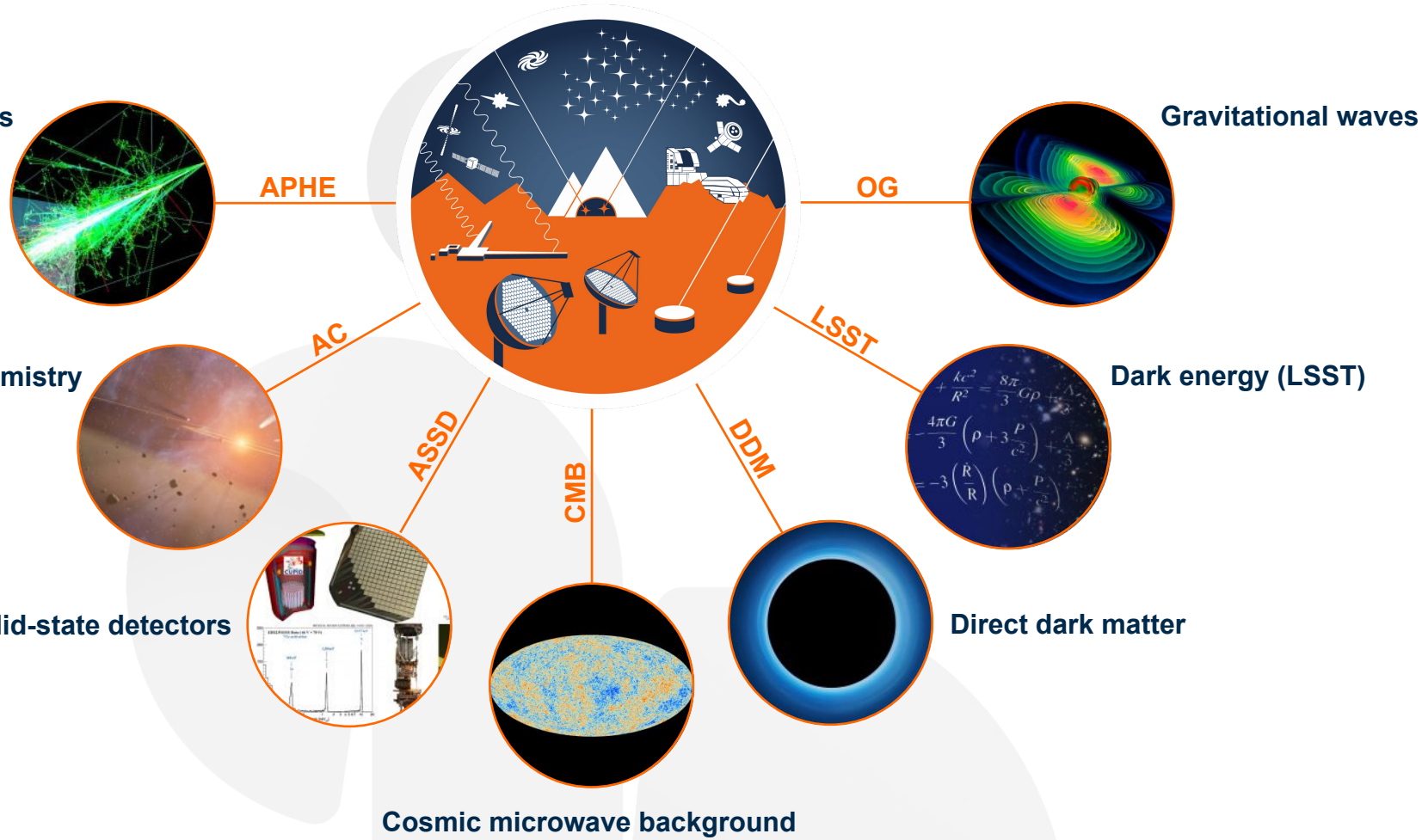
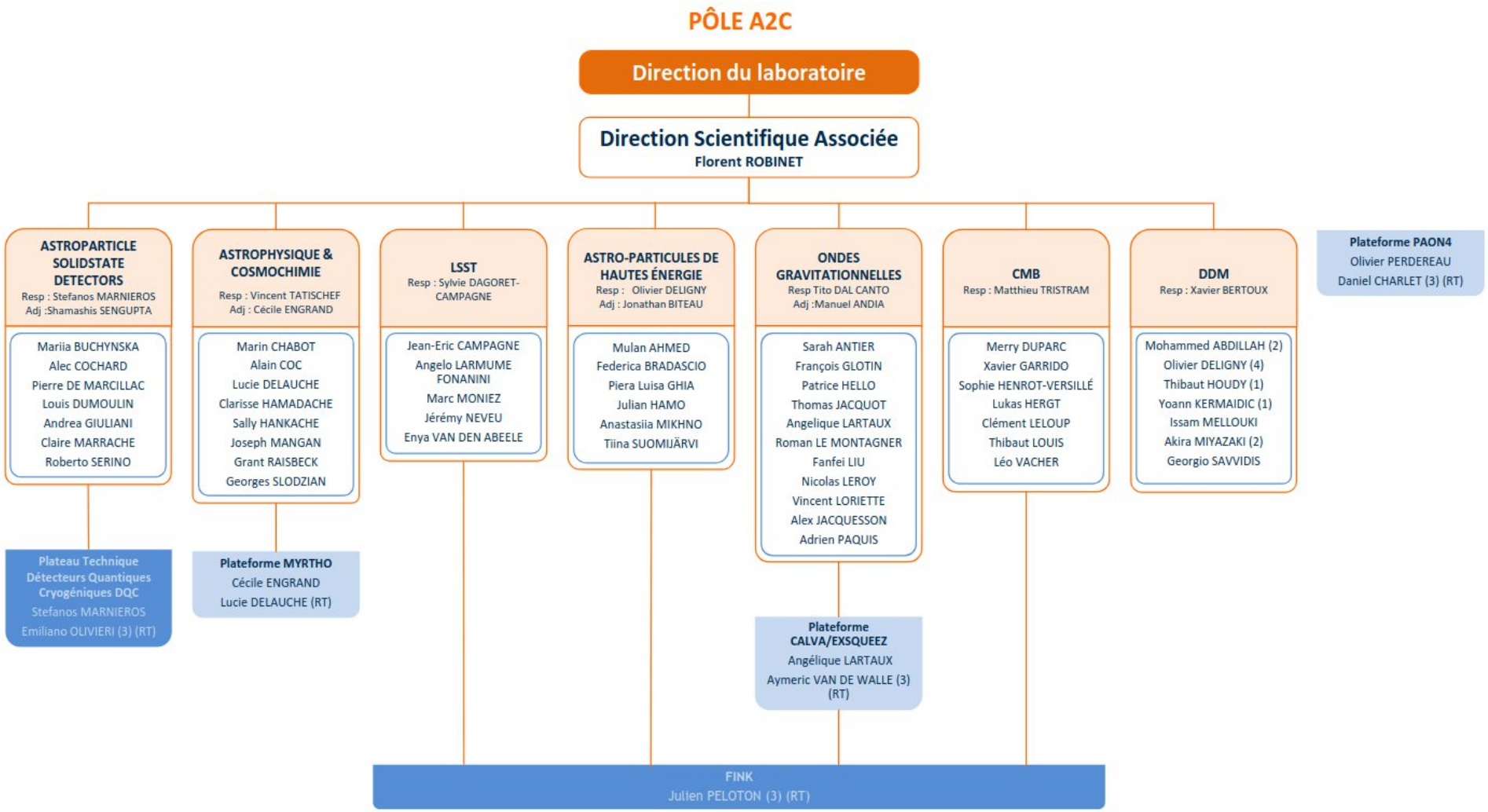
Florent Robinet and A2C teams
March 25, 2026: Visit of Oslo delegation

https://a2c.ijclab.in2p3.fr/en/a2c-home-en/

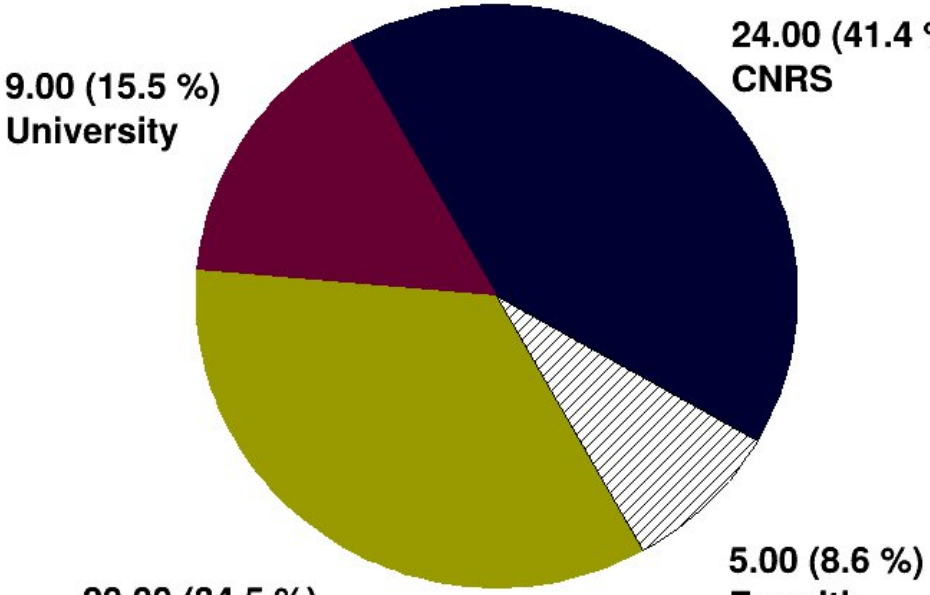
A2C science teams

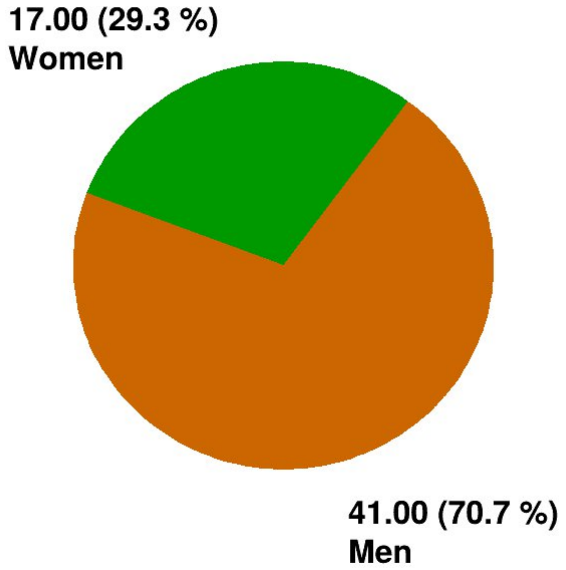


A2C science teams



A2C people





13 PhD students
7 Postdoc

58 researchers in A2C (Mar. 2026)
+ engineers (computing, instrumentation...)
+ ~30 internships / yr

A2C experimental facilities

CALVA: R&D for gravitational-wave detectors

- Frequency-dependent squeezing
- Auxiliary laser
- Optical cavity control
- 3 mirror cavities
- Phase-noise cancellation

MYRTHO: micrometeorite

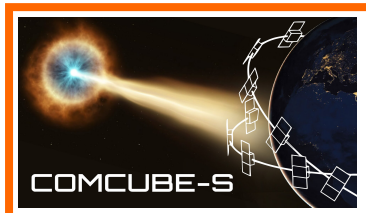
- Micrometeorite samples (e.g. Antarctica)
- Primitive asteroidal matter studies
- Analysis of physical and organic properties

PAON4 (Nancay): R&D for gravitational-wave detectors

- Intensity mapping instrument prototype
- Hydrogen 21 cm line
- Test for the IDROGEN technology (fast and synchronous electronics)

Astrophysics & cosmochemistry (AC)

Research topics



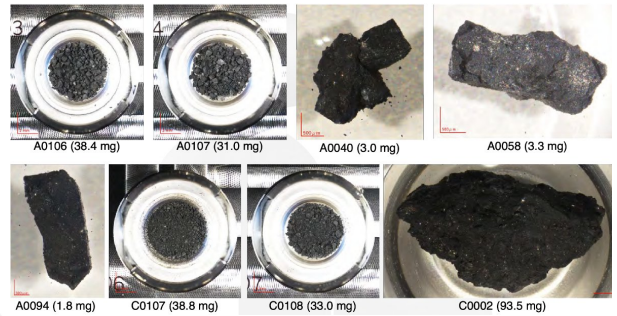
- Development of MeV gamma-ray detectors
- Cosmic radiation / matter interaction
- Gamma-ray burst astrophysics
- COMCUBE-S: CubeSat compton telescope prototype (polarization)
- Primordial nucleosynthesis

- Micrometeorite spectroscopic analyses
- Primitive asteroidal matter studies
- IR nanospectroscopy

Recent highlights

- 2024: gamma-ray polarization prototype (balloon)

- 2026: end of phase A for COMCUBE-S (ESA)



- Ryugu samples (HAYABUSA2 mission)

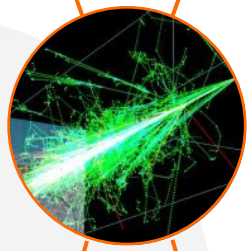
High-energy astroparticles (APHE)

Research topics

CTAO

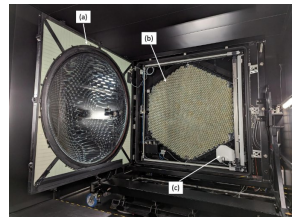
PIERRE AUGER OBSERVATORY

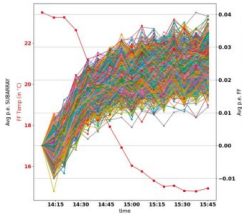
- Gamma-ray astronomy (20 GeV – 300 TeV)
- NectarCAM control, characterization and calibration
- Intensity interferometry
- Cosmic ray origin
- Auger: surface detectors, electronics, data analysis



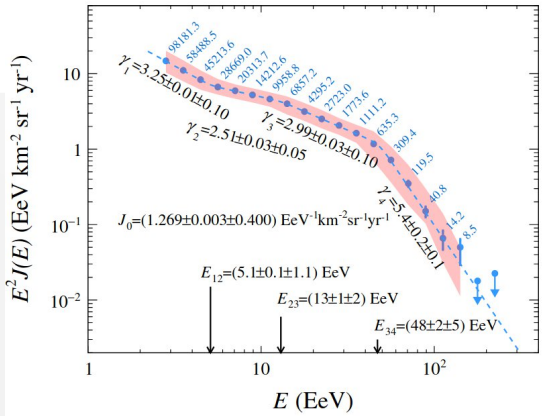
Recent highlights

- 2026: the IJCLab team joins the CTA/LST collaboration



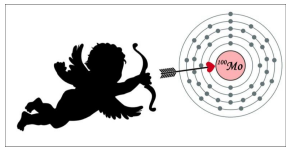


- 2025: NectarCAM calibration studies
- 2025: Instep structure in the cosmic ray spectrum
  Phys.Rev.Lett. 135 (2025) 24, 241002



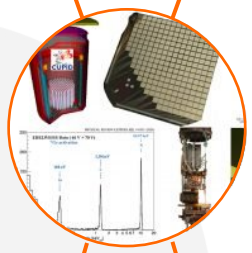
Astroparticles, solid-state detectors (ASSD)

Research topics

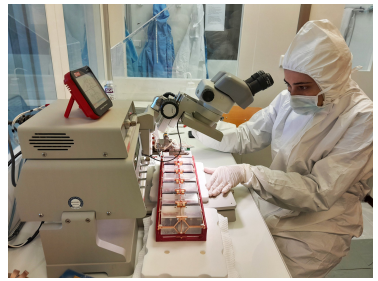


TESSERACT

- Neutrinoless double beta decay
- Explore physics beyond Standard Model
- Conception of Neganov-Trofimov-Luke (NTL) scintillating bolometers
- Development of TeO_2 bolometers
- Background analyses in light detectors
- Supraconductors studies
- TESSERACT: Cryogenic detectors with eV energy-threshold : Transition Edge Sensors (TES)
  → see also DDM slide

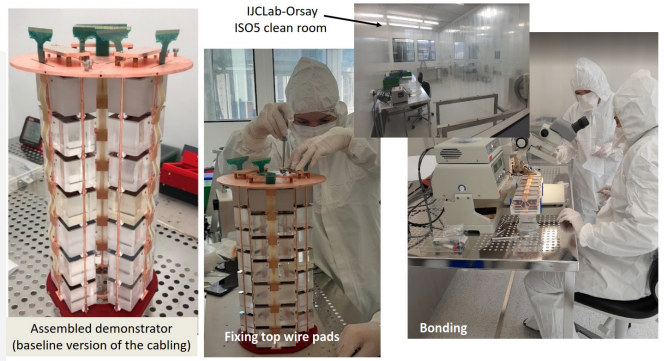


Recent highlights



- The CROSS experiment, designed and led by IJCLab, has just begun data collection at the Canfranc Underground Laboratory
- 2025: successful commissioning of the CROSS experiment

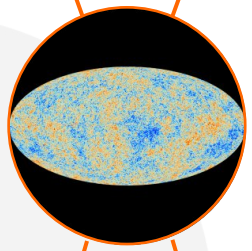
CROSS demonstrator: assembly



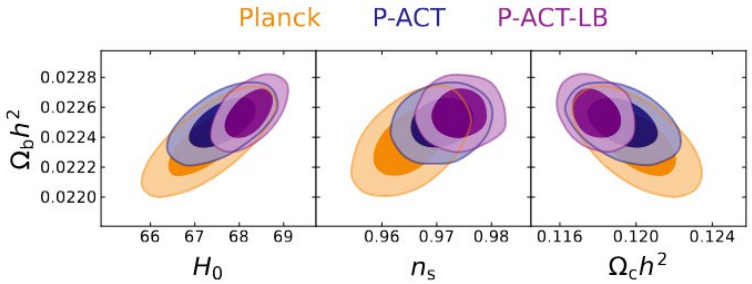
Cosmic microwave background (CMB)

Research topics

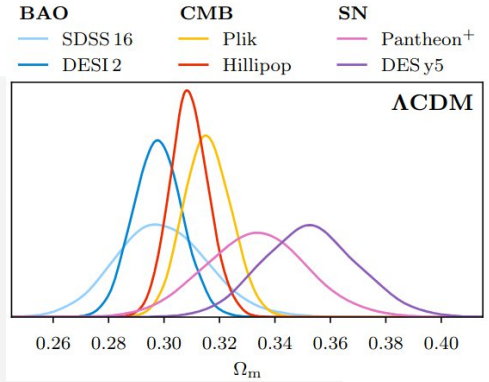
- Early universe, inflation
- Cosmological parameters global fit methods
- Map reconstruction
- Tension on cosmological parameter studies
- Test inflation models with cosmological and particle physics data
- LiteBIRD calibration and mechanical studies
- Forecast studies
- Participation in FOSSIL



Recent highlights



- Atacama Cosmology Telescope : data release 6
  JCAP 11 (2025) 062
- 2025: Simons Observatory first light → Promising cosmology studies
- 2026: Bayesian model comparison of multiple datasets
  e-Print: 2602.06115

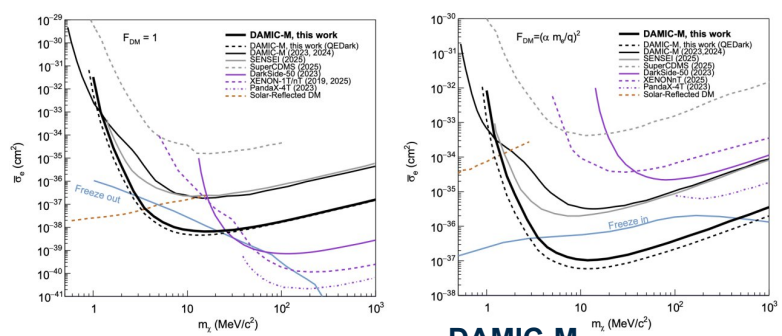


Direct dark matter (DDM)

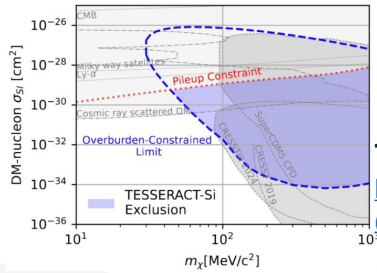
Research topics

- Transverse science at IJCLab: theory, accelerator, particle physics, astrophysics
- Targeted candidates: QCD axions, sterile neutrinos, ~~WIMP~~, hidden-sector DM
- Development of new axion models (theory)
- Development of skipper CCD (DAMIC-M)
- Development of cryogenic detectors (TESSERACT)
- Design and test of RF absorbers (MADMAX)
- Data analyses and upper-limit calculation

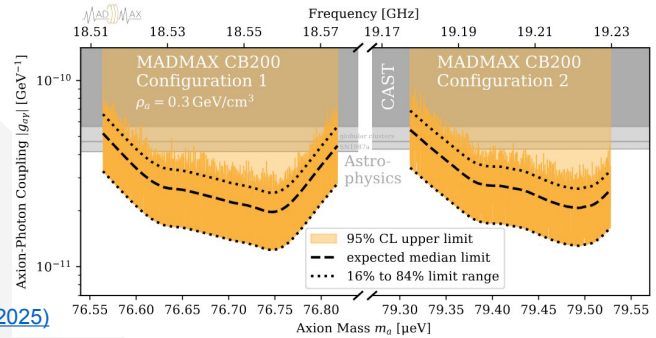
Recent highlights



DAMIC-M
Phys. Rev. Lett. 135, 071002 (2025)



TESSERACT
Phys. Rev. Lett. 135, 161002 (2025)



MADMAX prototype
Phys. Rev. Lett. 135, 041001 (2025)

Dark energy (LSST)

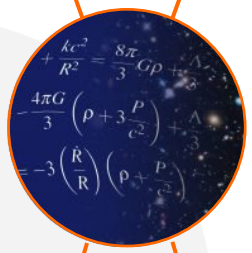
Research topics

VERA C. RUBIN OBSERVATORY

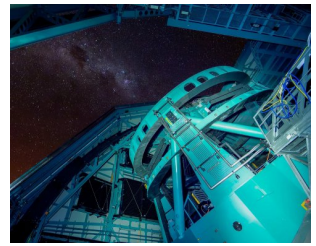
- Telescope photometric calibration (Auxtel, atmospheric)
- Development of photometric redshift methods
- Dark energy with supernovae
- Transient sky
- Jax-cosmo: C library for cosmological theory calculations

FINK

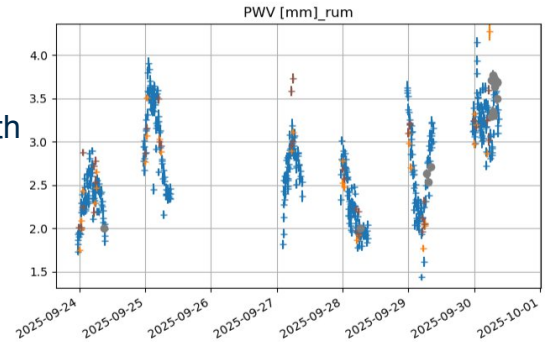
- Real-time infrastructure to digest 10 millions of alerts / night
- Fink broker is born and developed at IJCLab
- AI classification of transient alerts
- Integration at VirtualData



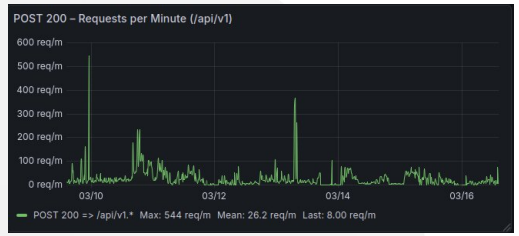
Recent highlights

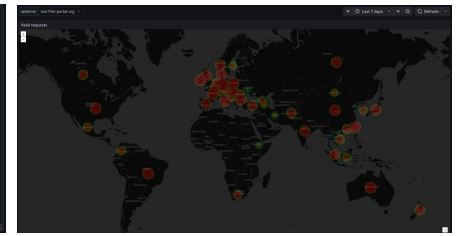


- 2025 : first light → breath-taking images
- Atmospheric water variations measured with AuxTel



- FINK start: alert management



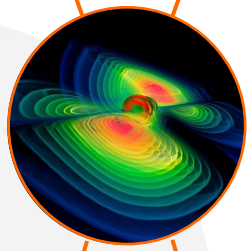


Gravitational waves (OG)

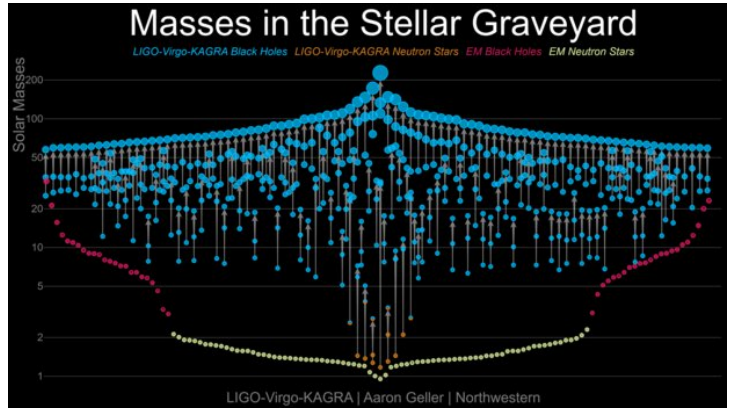
Research topics

- Searches for gravitational waves from compact binaries
- Searches for gravitational waves from core-collapse supernovae
- Detector characterization
- Development of squeezing techniques

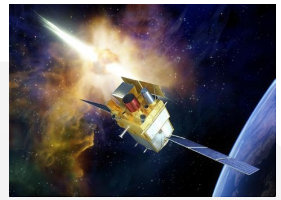
- Electromagnetic follow-up of gravitational-wave events
- Development of on-board software for high-energy space telescopes



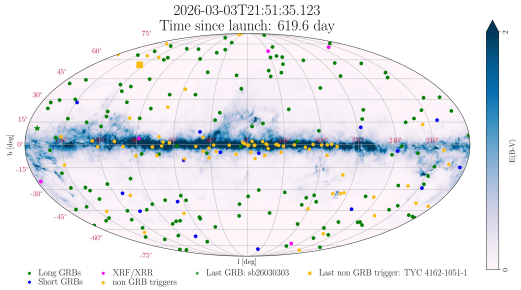
Recent highlights



- The LIGO-Virgo O4 run ended on Nov. 18, 2025
- 2.5 years of data were recorded
- 382 binary mergers have been detected in 10 years



- 2024: SVOM launch



- Many gamma-ray bursts are routinely detected
- GRB 250314A at z = 7.3