

JENAA

Joint ECFA-NuPECC-APPEC Activities



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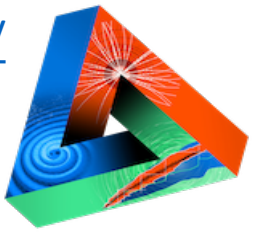
Paris Sphicas, Patricia Conde Muino | ECFA

Marek Lewitowicz, Sissy Körner | NuPECC

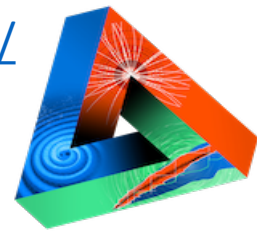
Andreas Haungs, Julie Epas | APPEC

ET-PP Computing -- Napoli (8-10/7/2024) and online





- Cooperation of nuclear, particle and astroparticle physics communities, represented by the three committees / consortia ECFA, NuPECC, APPEC
 - On purely volunteering basis
 - **Joint Seminars**
 - last: 3-6 May 2022 in Madrid <https://indico.cern.ch/event/1040535/>
 - next: April 2025, RAL, UK
 - **Expression of Interest Topics**
 - To explore topical synergies between our disciplines,
 - Support and moderate financial support by the ENA committees
 - **Working Groups**
 - Diversity Charter
 - Recognition working group
 - Computing working group
 - **Mutual contribution to the roadmapping**
 - NuPECC long range plan <https://indico.ph.tum.de/event/7593/>
 - European Strategy for Particle Physics March 2024 CERN Council launched the new ESPP process
 - APPEC Roadmap Midterm Update <https://indico.cern.ch/event/1339060/>

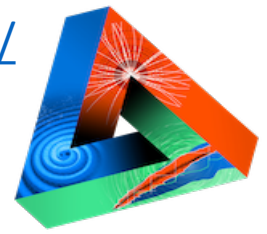


Expression of Interests (EoI)

1. Dark Matter - iDMEu (<https://indico.cern.ch/event/869195/overview>)
 2. Gravitational Waves for fundamental physics (<https://agenda.infn.it/event/22947/overview>)
 3. Machine-Learning Optimized Design of Experiments - MODE (<https://mode-collaboration.github.io>)
 4. Nuclear Physics at the LHC (<https://indico.ph.tum.de/event/4492/>)
 5. EDM - Search of Charged-Particle Electric Dipole Moments (<https://indico.ph.tum.de/event/4482/>)
 6. Synergies of EIC with LHC - EIC; kick-off happened in June 2022 (<https://indico.ph.tum.de/event/7004/>)
 7. EuCAIF (2023): Machine learning as analysis tool (<https://indico.nikhef.nl/event/4875/>)
- **Contact persons from ENA communities**
 - **Request for presentations at JENASymposium 2025**
 - **Discussions on status, plans, requests regularly with ENA chairs**
- ➔ **currently all are validated as community overarching networks and supported by JENA**

JENA Computing Initiative

<http://nupecc.org/jenaa/>



- JENA Computing Workshop in Bologna: 12-14 June 2023
- <https://agenda.infn.it/event/34738/>
- Motivation: JENAS 2022 → There is a need for a European Workshop on (federated) Computing! → Preparation for JENAS 2025
- 60-70 participants plus up to 25 online
- Topics were all aspects of (federated) computing by talks, round table discussions, initiation of the JENA computing working group, ...
- Covering computing, HPC vs. HTC, software, data management, open data, sustainability

JENA Computing Workshop


12 Jun 2023, 12:00 → 14 Jun 2023, 18:00 Europe/Rome
Auditorium Biagi (Biblioteca Salaborsa)
Andreas Haungs (Karlsruhe Institute of Technology), Claudio Grandi (Istituto Nazionale di Fisica Nucleare), Luca Dell'Agnello (Istituto Nazionale di Fisica Nucleare)

Description


ECFA European Committee for Future Accelerators

NuPECC

APPEC

 **JENAA**
Joint ECFA-NuPECC-APPEC Activities

To be held as in-person meeting in Bologna, Italy.

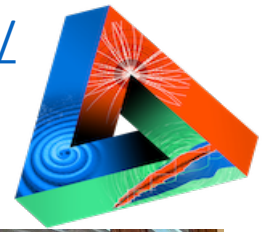


Motivation

At the Joint ECFA-NuPECC-APPEC (JENA) Seminar in May 2022 in Madrid (<https://indico.cern.ch/event/1040535/>), both the plenary presentations and the closed session of funding agency representatives revealed that there is an increased need for discussions on the strategy and implementation of European federated computing at future large-scale research facilities.

JENA Computing Workshop

<http://nupecc.org/jenaa/>



• Results:

Target: European white paper on (ENA) computing as input for the next JENA Symposium

Dedicated working groups (to look deeper) on five areas:

- **HPC:**
https://indico.scc.kit.edu/e/JENA_computing_wp1/
- **Software:**
https://indico.scc.kit.edu/e/JENA_computing_wp2/
- **Data Management:**
https://indico.scc.kit.edu/e/JENA_computing_wp3/
- **ML & AI:**
https://indico.scc.kit.edu/e/JENA_computing_wp4/
- **Training:**
https://indico.scc.kit.edu/e/JENA_computing_wp5/

• Next:

- Working groups have started activities...
- Still possible for participation in the various working groups



The Future of Astroparticle Physics The European View

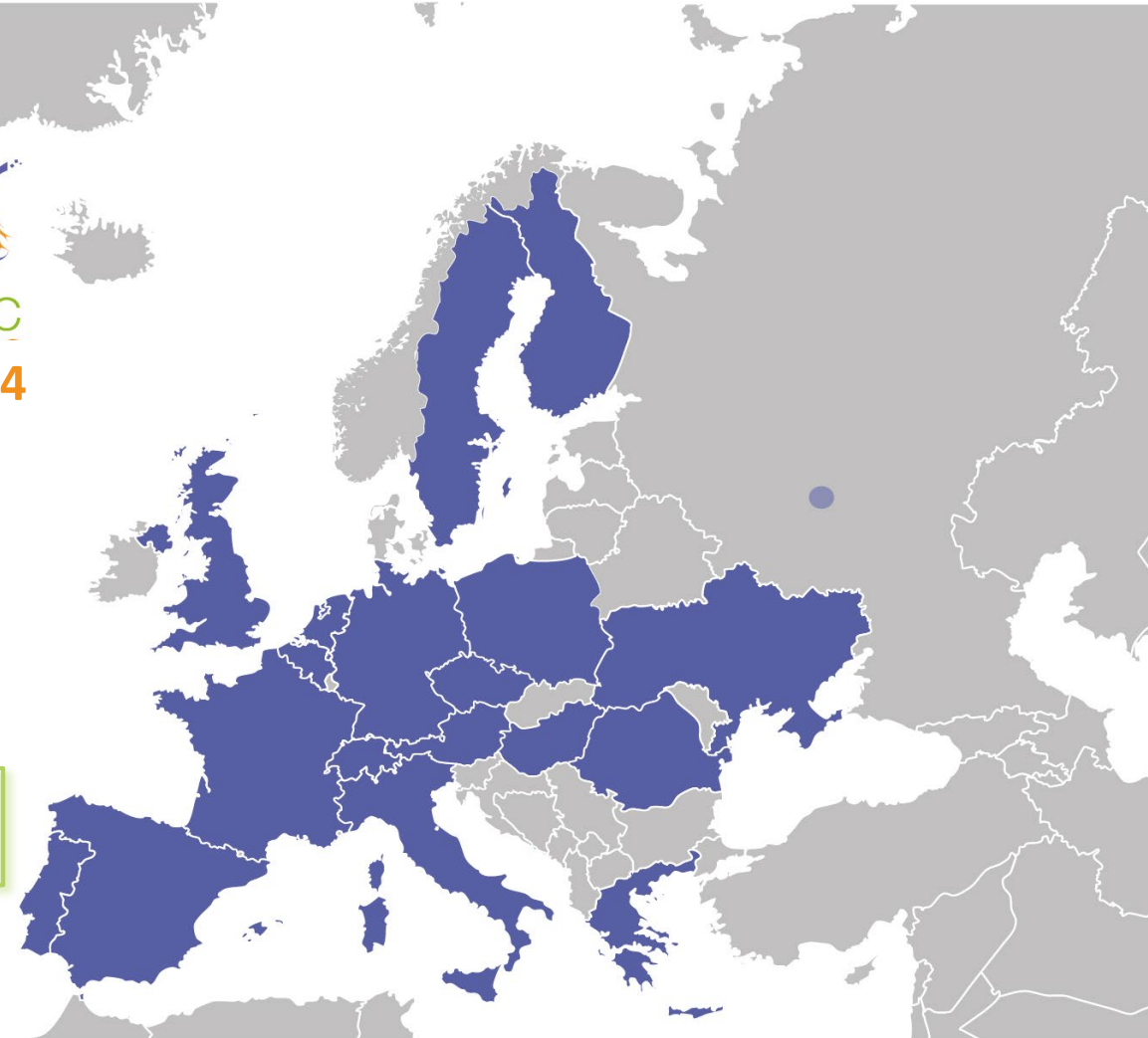
[RoadmapUpdate.pdf](#)



European
Astroparticle Physics
Strategy 2017-2026
Mid-Term Update
September 2023

AstroParticle Physics European Consortium

- an international coordinating structure, founded in 2012
- Based on MoUs by all partners and an APPEC Common Fund with c. 70k€/year
- 18 (+1 suspended) member countries with 22 funding agencies
 - In discussion with Denmark and Norway
- 3 bodies:
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APPEC Roadmaps

<https://www.appec.org/roadmap>

2008



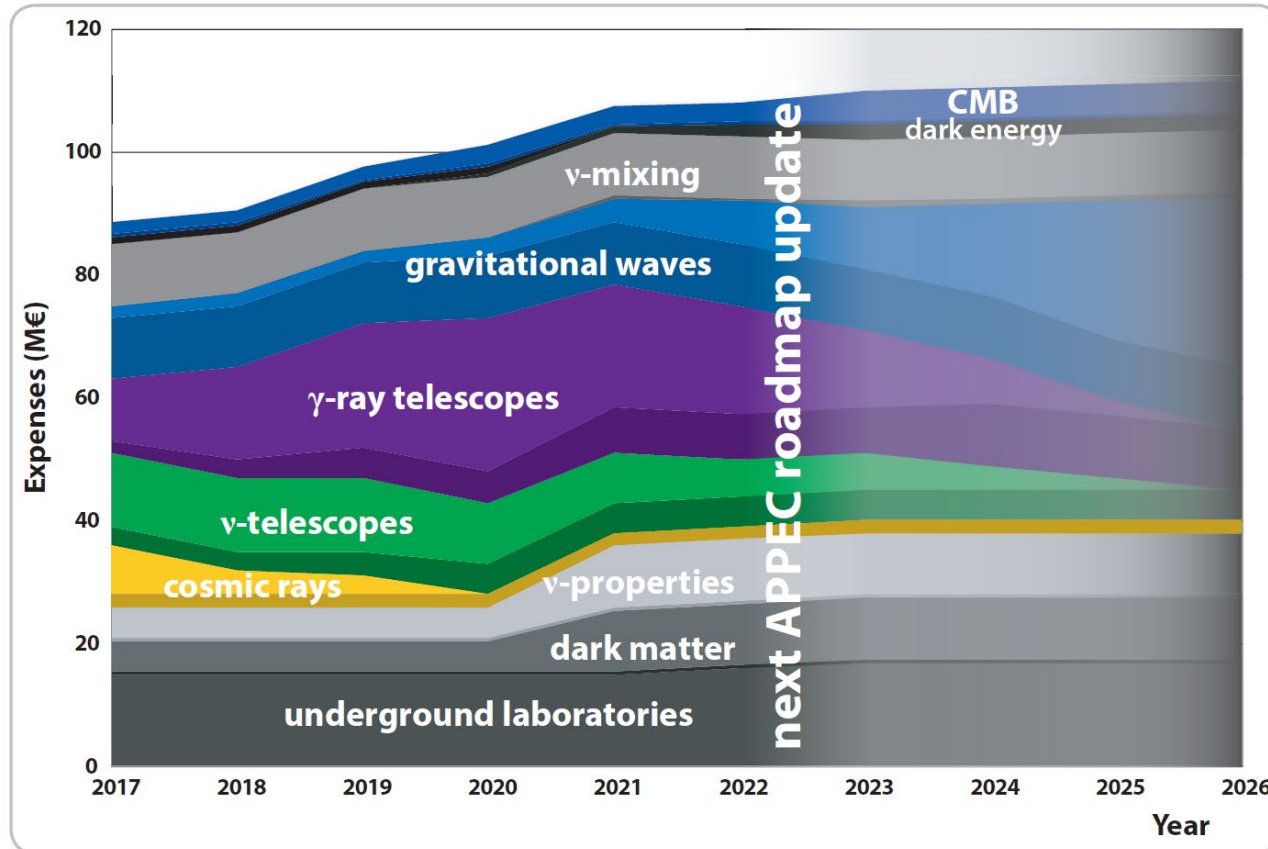
2011



2017



Midterm Evaluation and Update of the Roadmap



From Roadmap 2017: Projected annual capital investment

- A resource aware roadmap
(darker colors also show M&O of RI)
- Midterm Evaluation: Preparation of roadmap update <https://www.appec.org/mid-term-review>
 - Direct Dark Matter working group
 - Double Beta Decay APPEC Sub-Committee
 - Multi-Messenger Discussion Workshops
 - Coordination workshop of Underground Labs
 - Town Meeting June 2022 <https://indico.desy.de/event/25372/>
 - Census / Survey of time and cost lines
- Goals
 - Identify new developments and new topics
 - Update recommendations
 - Update of time and cost line

APPEC roadmap - scientific topics

- High-energy gamma rays
- High-energy neutrinos
- High-energy cosmic rays
- Gravitational waves
- WIMP Dark Matter
- Non-WIMP Dark Matter
- Neutrino mass and nature
- Neutrino mixing and mass ordering
- Cosmic Microwave Background
- Dark Energy
- Multi-messenger astroparticle physics
- Astroparticle theory
- Detector R&D
- Computing and data policies



Recommendations are given for each topic

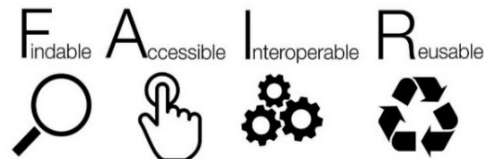
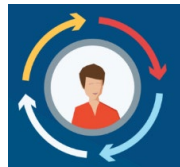
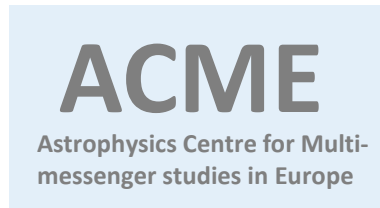
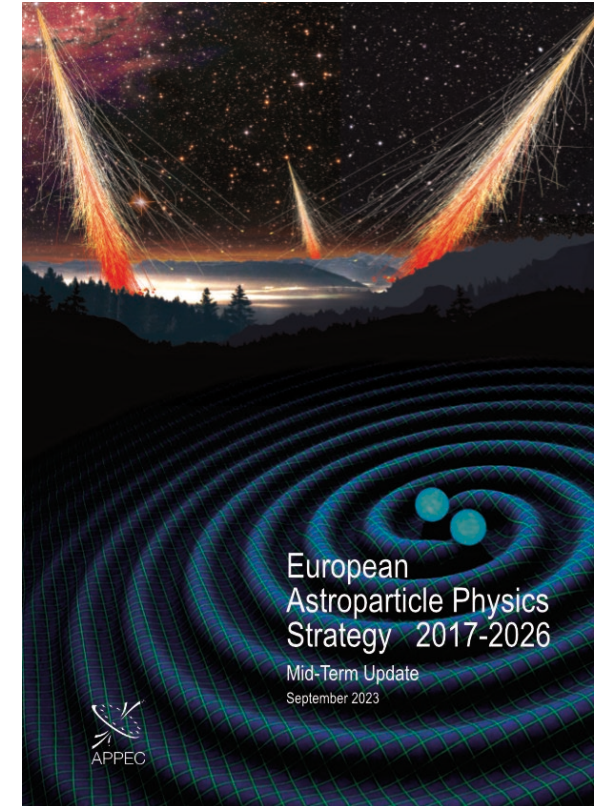
[RoadmapUpdate.pdf](#)

Roadmap - Connecting to Society and Organisation

- Ecological Impact
- Societal Impact
- Open Science and Citizen Science
- Human Talent Management
- Central Infrastructures
- European and Global Cooperation
- Interdisciplinary Opportunities

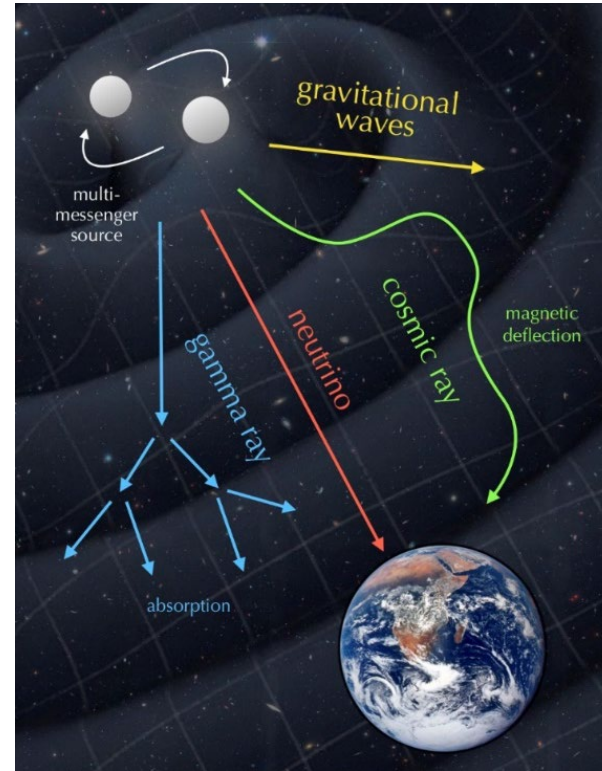
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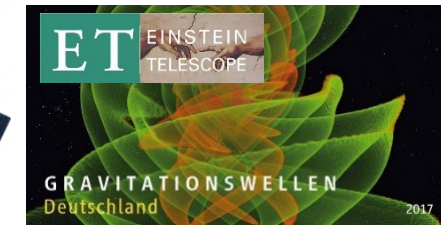
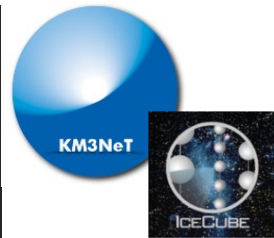
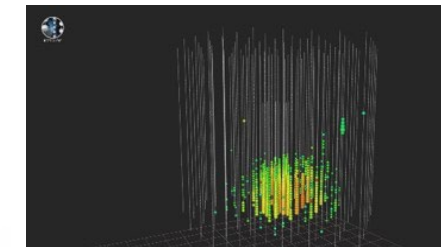
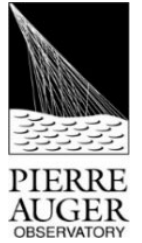
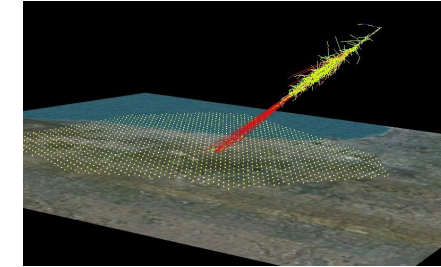
The High-Energy Universe: Multi-Messenger Astroparticle Physics

- Required to understand the sources of cosmic rays and the physics processes in the high-energy Universe
- Needs long-term operational observatories
- And a sophisticated Big Data management: Big Data Analytics; Research Data Management; Data Curation; Open Data..... preferably in real-time!

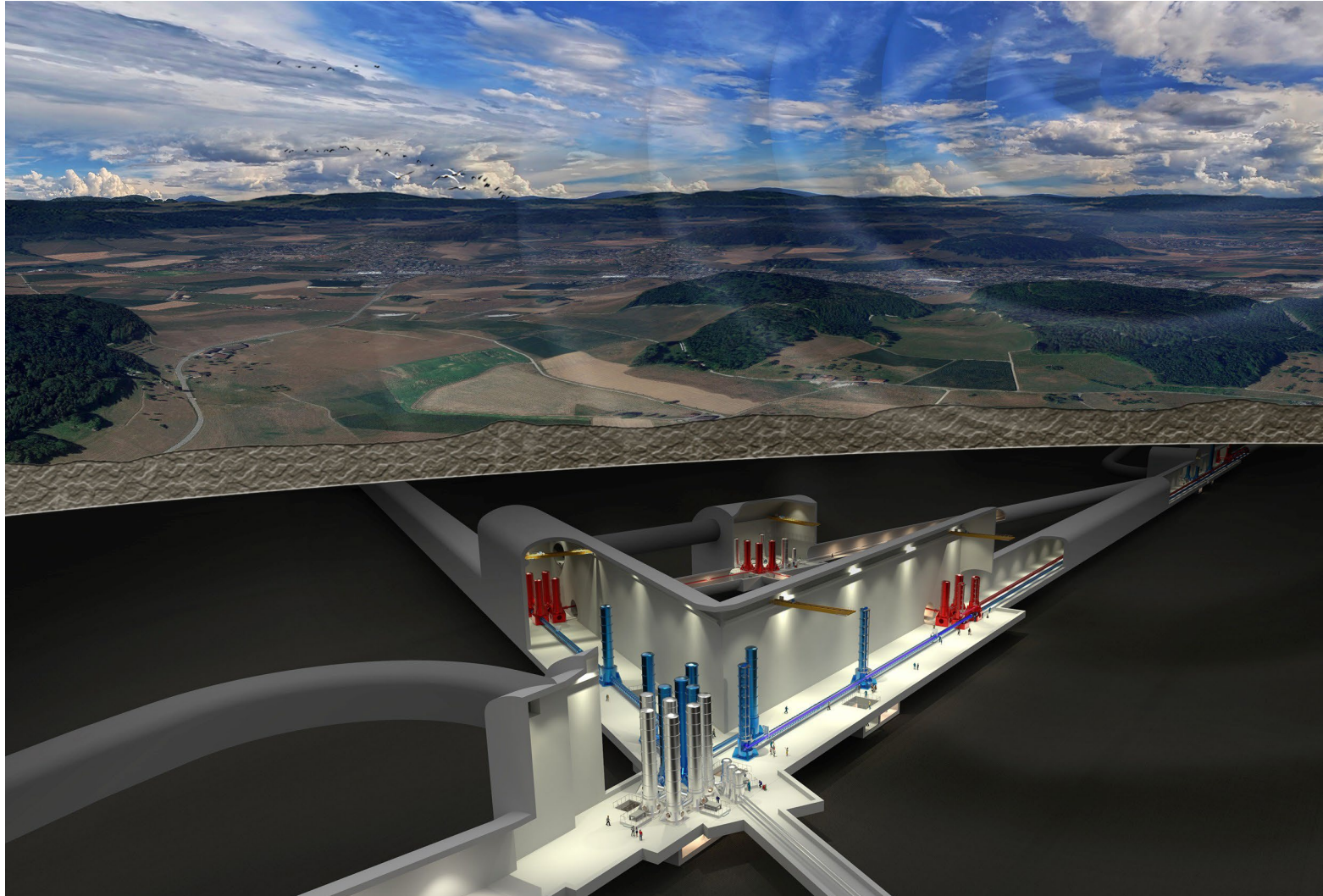


+ instruments for multiwavelength astronomy

SKAO



Gravitational Waves



APPEC strongly supports actions to enlarge European countries' participation in ET, acquire funds for ET construction and operations, and develop the ET scientific community. APPEC supports building the bridge between second and third-generation detectors to maintain European expertise and leadership in the field and the VIRGO observation capability up to when the ET will start observations. APPEC strongly supports the LISA mission.

Multi-Messenger Astroparticle Physics

APPEC supports the further development and coordination of optimised multi-messenger observational strategies, common tools and data formats. Optimising future observatories for multi-messenger observations is strongly supported. APPEC encourages efforts to enhance collaboration among theorists, experimentalists, observers, and experts in data analysis and computing from different communities.



Computing and Data Policies

APPEC requests all relevant experiments to continue to have their computing requirements scrutinised. APPEC will engage with the particle physics and astronomy communities to secure a balance between available European computing resources and needs for now and into the future. Appropriate training in data science should be provided for astroparticle physicists.

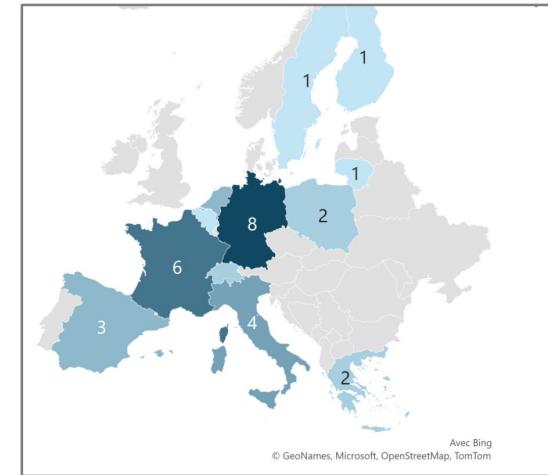
ACME - Astrophysics Centre for Multimessenger studies in Europe

HORIZON-INFRA-2023-SERV-01-02 (domain: Astronomy & Astroparticle physics)

- Topic: **better access of users to RI services to advance frontier knowledge**
- **ACME is an ambitious coordinated European-wide optimization of the accessibility and cohesion between multiple leading RI, offering access to instruments, data and expertise.**
- Selected for funding by the European Commission: 14.5 M€ (in Feb 2024)
- Provides in 7 WP Transnational access (TA) and Virtual Access (VA) to RI and harmonize data formats and data analysis tools
- Consortium: 41 partners, 15 countries, >30 research infrastructures
- Grant Agreement nearly done; start Sep or Oct 2024



Astronet

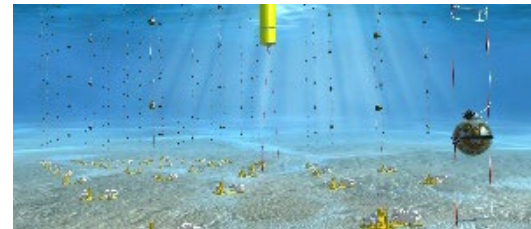


APPEC Flagship Research Infrastructures

This is not a closed, but dynamic list...

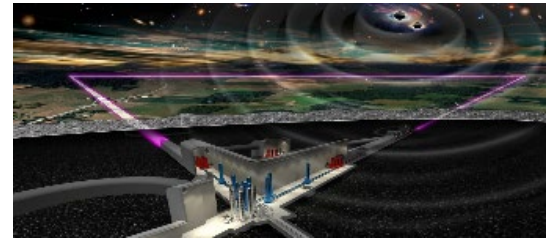
ESFRI=European Strategy Forum on Research Infrastructures

[construction KM3NeT 2020-2026; IceCube-Gen2]



ESFRI

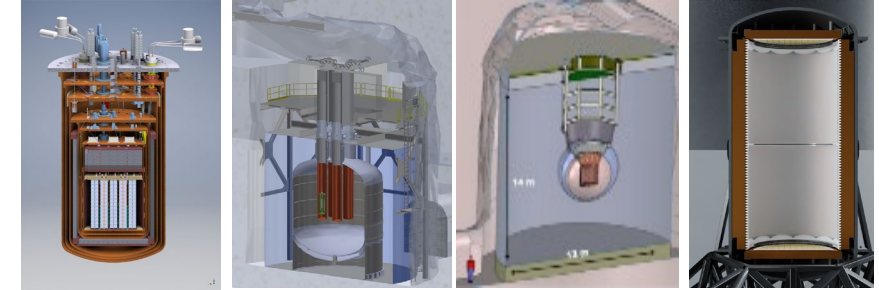
HE Neutrinos



ESFRI

[construction Einstein Telescope 2026-]

Gravitational Waves



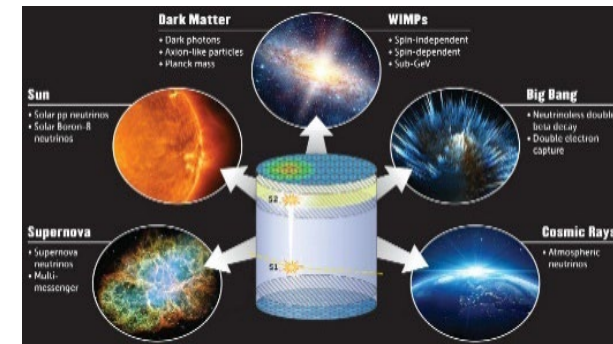
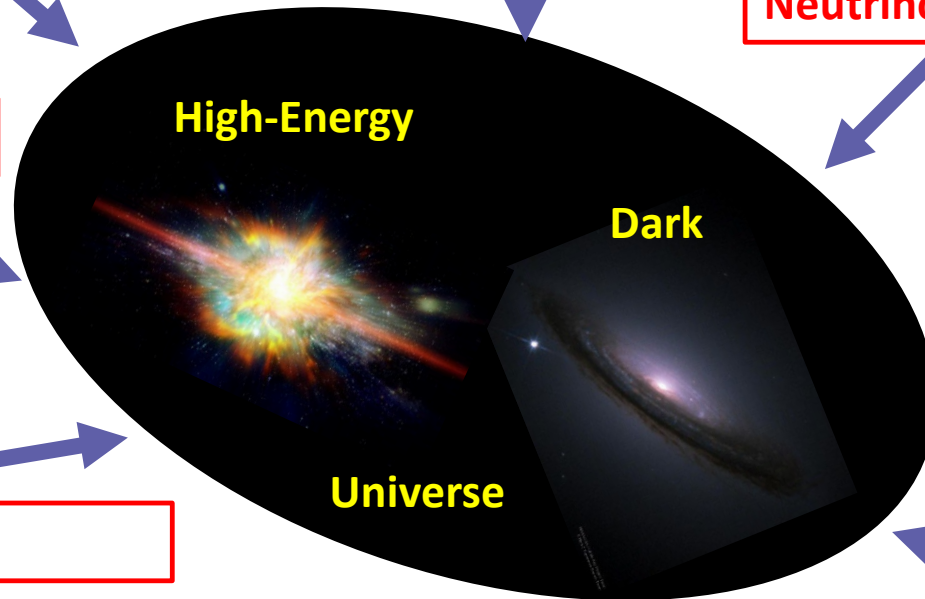
[construction LEGEND-1000 / nEXO 2023- ; ...]

Neutrino Properties

[construction AugerPrime 2019-2023]

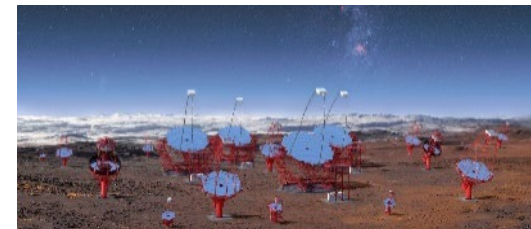


HE Cosmic Rays



Dark Matter

[construction CTA 2021-]



ESFRI

HE Gamma Rays

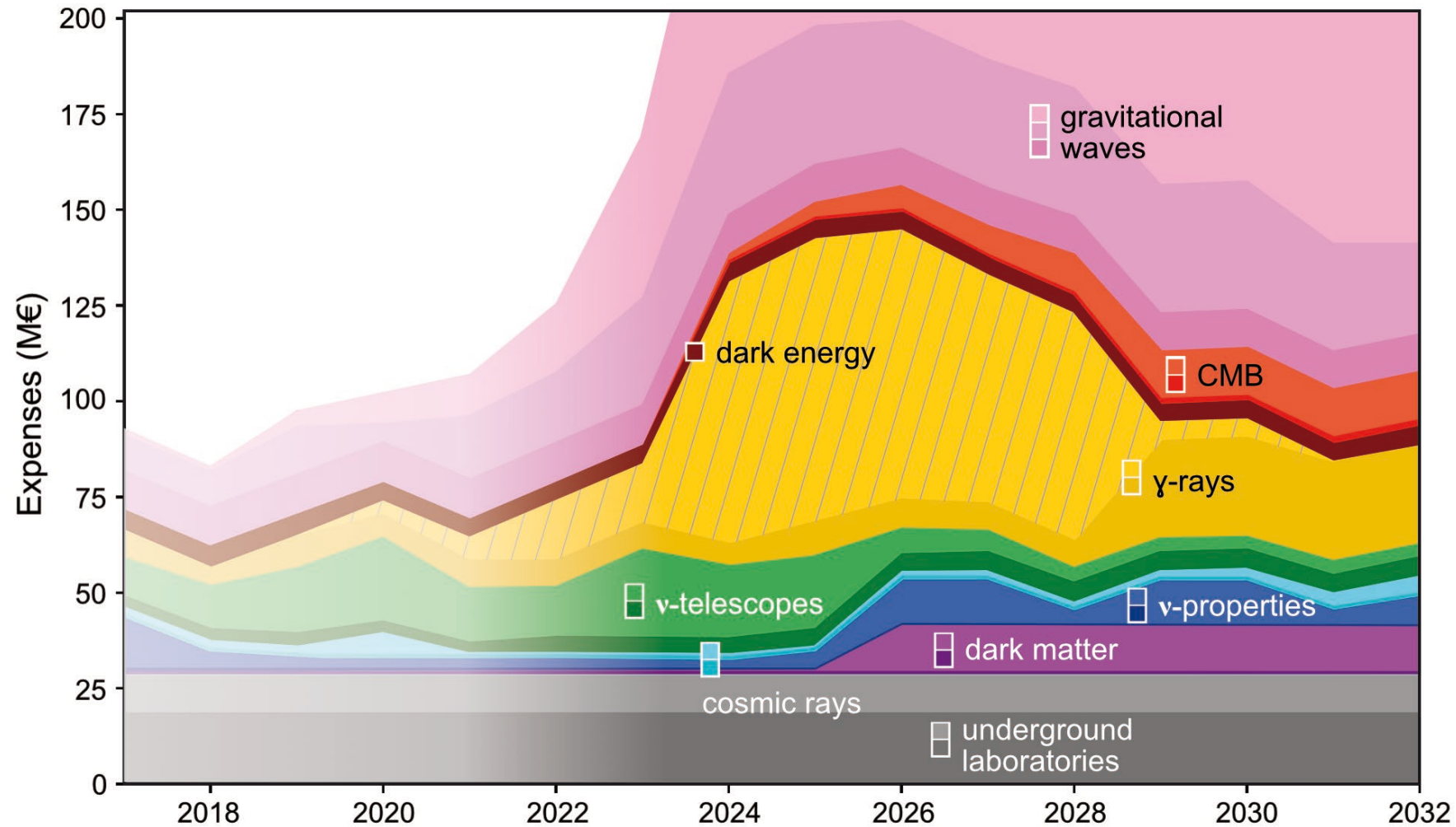
Ressources

A resource aware roadmap (darker colors show M&O of RI)

Observations:

- Predictions from 2017 (until 2022) were okay
- CTA-peak shifted to later years compared to 2017 roadmap
- CTA-investments funded
- HE Neutrinos: stretched
- ET peak has 3 colors operation, instrument, infrastructure)

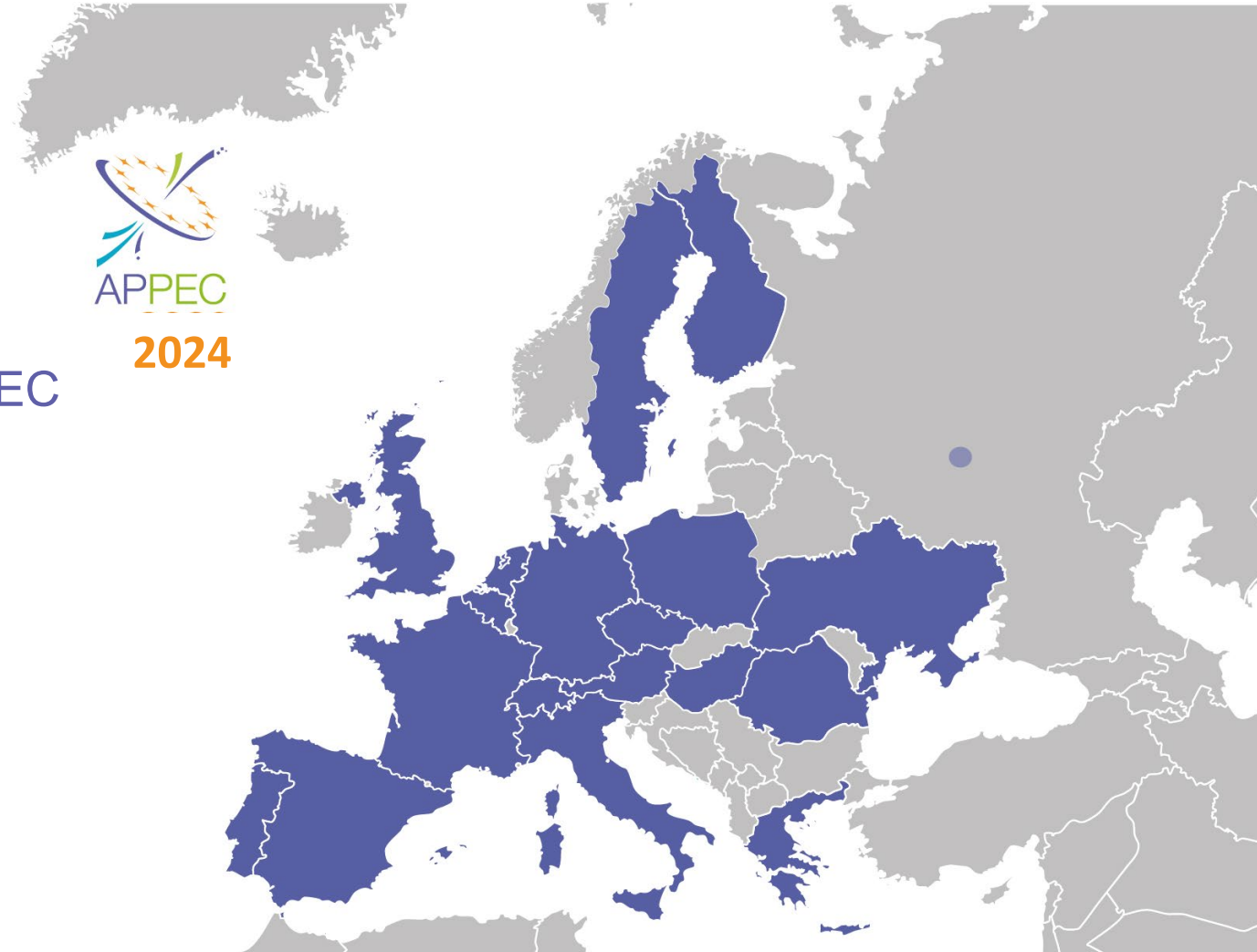
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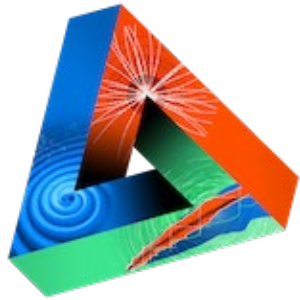


Roadmap Update 2023: Projected annual capital investment

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 - Scientific Advisory Committee;
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We thank ET for helping in the JENA Computing Initiative and wish good luck and success for this workshop and future activities!