# *Astroparticle Physics Planning in Europe and Horizon 2020*

Warsaw 7 Jan 2014

Stavros Katsanevas
APPEC Chairman, APC-Paris Diderot,IN2P3/CNRS

# After 2012-2013 Astroparticle Physics in focus
# Going up and down the cosmic ladder

« Another » Jacob's ladder?

The Astroparticle domain after LHC/PLANCK/ν results can be reduced to 2 fundamental questions:

1) Are there any intermediate scales between the EW scale and Inflation ? If yes how many and where are they ?
   - Inflation, dark energy and matter
   - Neutrino properties and proton decay

2) Are there new energy scales at work in the most violent phenomena of the Universe? How do particles and fields shape the formation and evolution of cosmic structures ?
   - High energy photons, neutrinos, CR
   - Gravitational waves

# A short history of European Astroparticle Physics Coordination APPEC (2001-2013)

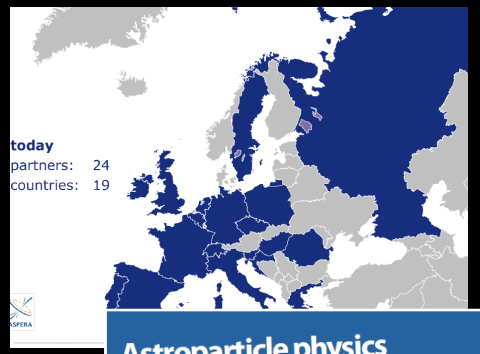
✓**2001-2012** **A**stroparticle European Coordination (APPEC). Started with 5 agencies

✓**2006-2012** ERANET ASPERA (EU funds FP6 and FP7)

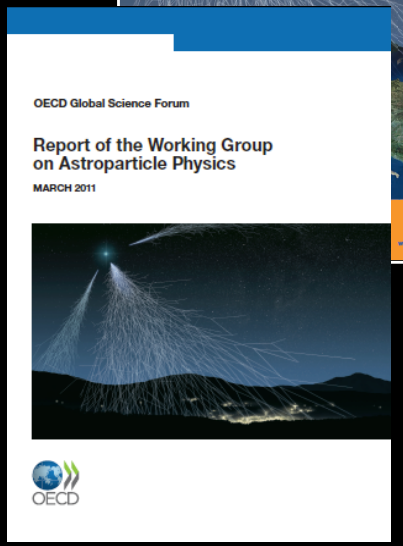
- ✓ 19 countries totalling a program of 3000 researchers and 220 M€/year consolidated funds.
- ✓ Roadmap (from definition 2008 to priorities 2011)
- ✓ Accompanying actions (next slide)
- ✓ Initiative for global coordination:
  - ✓Workshops (Brussels, Paris),
  - ✓OECD/GSF group APIF

**2012** Astroparticle European Consortium (APPEC)

- ✓ Agency funded coordination (MoU).
- ✓ Currently 15 European countries (including Poland)
- ✓ 3 functional centres (France, Germany, Italy) + Spain







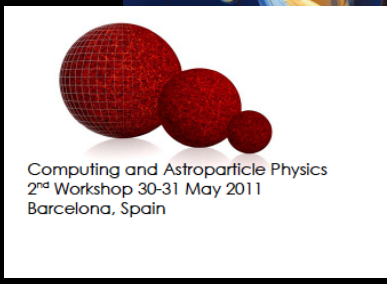
# APPEC (ASPERA) actions

***Reports and presentations in www.appec.org***

- R&D (common funding, total 9 M€; 2010-2012)
  - Dark matter (DARWIN, EURECA) , CTA, Neutrino mass (GERDA, LUCFIFER) , Auger, Low energy neutrino (LENA, ORCA,PINGU) and ET (GW)

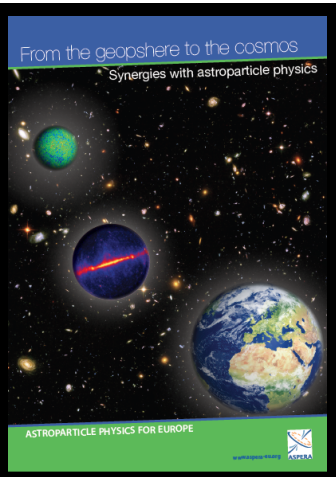
- Industrial contacts (Munich, Pisa, Darmstadt; 2010-2012)
  - Photosensors, Electronics, Mirrors, Lasers, Cryogenics, Vacuum


- Computing (Lyon, Barcelona, Hannover; 2010-2012)
  - Astroparticle computing ranges from signal analysis (GW) through event crunching (CR) to large surveys (DE ).
  - Towards a white paper (2014). Discussions with CERN and others for a "new" computing model.




- Interdisciplinarity (Paris, Amsterdam, Durham; 2010-2012)
  - Geosciences, Biodiversity, Climate,…

- Theory (Particle Astrophysics, Cosmology Program, PACT, 2013)
  - ✓ Workshops, School, common funding of postdocs



# European programmatic context

- APPEC: a new SAC: mandate to produce a roadmap update "within constraints of agency budgets" by spring 2014.
- CERN: European Strategy for Particle Physics (APPEC input)
- ESFRI: (European Strategic Forum for Research Infrastructures) provides input to Ministries (new chair J. Womersley). The AEG advisory group to ESFRI judging projects on financial and managerial maturity ranked CTA rank B ("might be able to achieve maturity by 2015, if substantial actions are implemented to address the bottlenecks and weaknesses") and the full KM3NET rank C ( "minimal chances of achieving maturity by 2015 for various reasons"). The ESFRI group currently re-examines the projects, adding scientific criteria to the evaluation. ESFRI opinions are a determinant input to EU funding (central infrastructures, data access, legal entities etc). Update of the roadmap in 2016.
- European Union 11-12-2014 start of the Horizon 2020 (H2020) program (70 BE in 7 years). APPEC actively coordinates in view of H2020 calls of funds on:
  - Large Research Infrastructures (CTA, KM3NET)
  - Networking (Gravitational waves, Underground labs)
  - Design studies, R&D, individual grants, postdocs, e-infrastructures, KT,
  - International coordination on RI .
  - BUT CONSTRUCTION FUNDS HAVE TO COME DIRECTLY FROM THE AGENCIES


# Summary of the roadmap statements of November 2011, specified in January 2013 as input to the European Strategy of Particle Physics

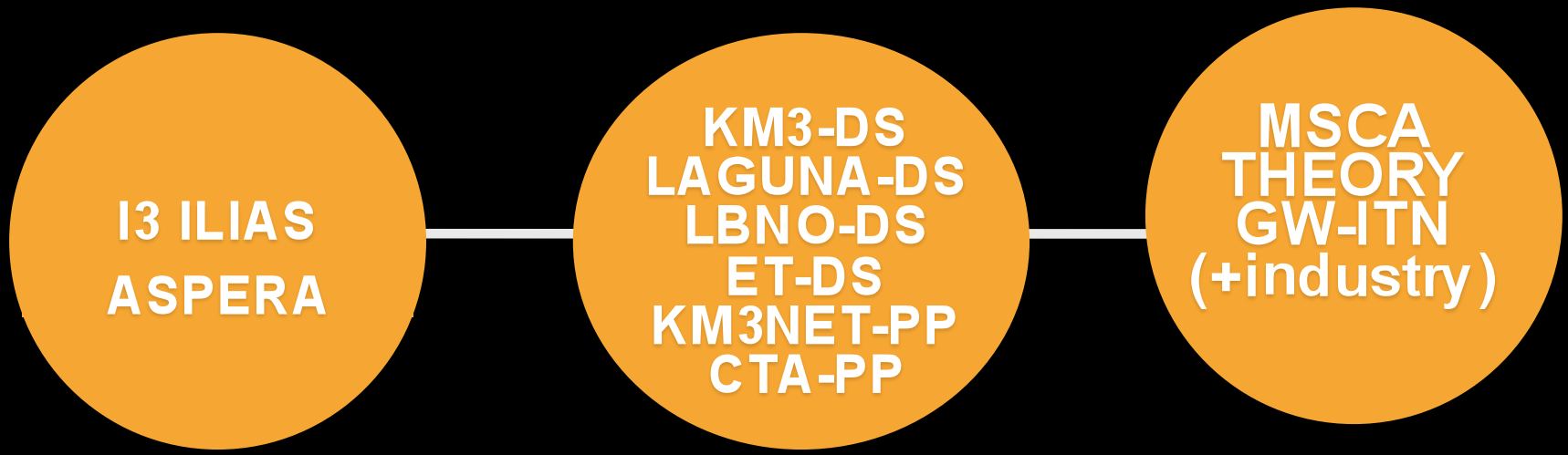
APPEC supports:

I. In the category of medium scale projects: the timely completion of the 2nd generation upgrades of gravitational wave antennas, as well as the upgrades/constructions towards ton-scale detectors for dark matter and double-beta neutrino mass experiments.

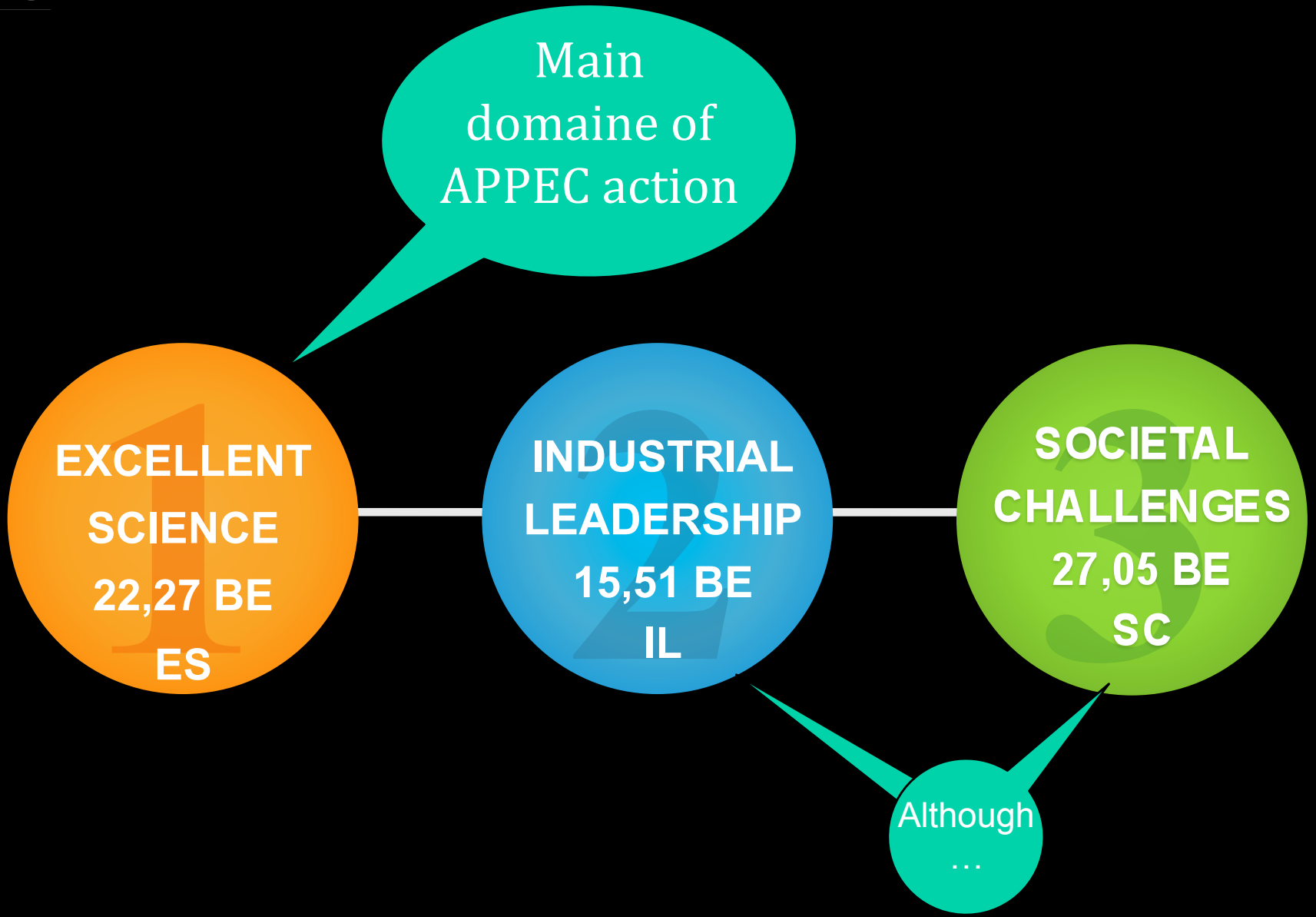
II. In the category of large-scale projects a high priority is given to the construction of the Cherenkov Telescope Array (CTA), and strong support for the first phase of KM3NeT, as well as R&D towards the definition of the next generation ground-based observatory for high energy cosmic rays.

III. Finally there needs to be coordination with other European/non-European organizations for the realization of billion-euro scale projects at the 2020 horizon, in particular a 50-500 kt scale low-energy neutrino astrophysics/ proton-decay detector. Other projects on this cost scale are_dark energy surveys on ground and in space, and in a longer perspective gravitational wave antennas with cosmological sensitivity on ground and in space.

# APPEC programs in FP6-FP7



# Horizon 2020
# Research and Innovation in three pillars



# Horizon 2020
# Research and Innovation in three pillars

Main domaine of APPEC action

**EXCELLENT SCIENCE**
**22,27 BE**
**ES**

**Excellent Science**

1) European Research Council
2) Future and Emerging Technologies
3) Marie Skłodowska Curie Actions
4) Research Infrastructures

# ES: Developing new world-class research infrastructures

## 1. INFRADEV-1-2014: DESIGN STUDIES (15 ME (up to 3ME each project), 02/09/2014)

- Support the conceptual and technical design and preparatory actions for new leading-edge research infrastructures in all fields of science and technology, which are of a clear European dimension and interest.
- Should address all key questions concerning the technical, legal and financial feasibility of new or upgraded facilities, leading to a 'conceptual design report' showing the maturity of the concept and forming the basis for identifying and constructing the next generation of Europe's and the world's leading research infrastructures.

APP interest: multi-ton dark matter and neutrino detector

## 2. INFRADEV-2-2015: PP OF ESFRI PROJECTS (14 ME (up to 2ME each project),14/01/2015)

- Provide catalytic and leveraging support for the preparatory phase leading to the construction of new research infrastructures or major upgrades of existing ones.
- The preparatory phase aims at bringing the project for the new or upgraded research infrastructure identified in the ESFRI roadmap or in the European strategy for particle physics (CERN Council) to the level of legal, financial, and, where applicable, technical maturity required for implementing it.
- Proposal consortia should involve all the stakeholders necessary to move the project forward, to take the decisions, and to make the financial commitments necessary before construction can start (e.g. national/ regional ministries/governments, research councils, funding agencies).

APP interest: CTA

# ES: Developing new world-class research infrastructures

## 3. INFRADEV-3-2015: IMPLEMENTATION ESFRI PROJECTS (90 ME (up to 15ME each project), 14/01/2015)

- Target the implementation and initial operation of new research infrastructures, which are identified by ESFRI in the context of the prioritisation exercise, as requiring a specific support to complete or launch their construction, fulfilment of the Innovation Union commitments.
- Support will be provided for central coordination, operation, access provision, enlargement of the membership, training and innovation activities. Activities can include setting up and initial running of the central coordination office, enhancement of the technical architecture, detailed R&D and engineering work, development of innovative components, users' access, data management (including possible open access to data), inter- operability, standardisation, outreach, training and international cooperation. Specific attention will be given to the role of industry, in particular to facilitate where relevant the access of SMEs as users and partners of the research infrastructure for technological developments.

APP interest: CTA

## 4. INFRADEV-4-2014/2015 - CLUSTER OF ESFRI RESEARCH INFRASTRUCTURES (55 ME (up to 15ME each project), 02/09/2014)

- For ESFRI projects, other world class research infrastructures, ERICs, e-infrastructures and Integrating Activity projects to coordinate common activities, to define harmonised policies for access to the infrastructures and data lifecycle (acquisition, access, deposit, sharing and re-use), to develop and deploy common underpinning technologies and services, and to implement common and efficient solutions on issues such as, for example, data sharing and provision, architecture of distributed infrastructures, distributed and virtual access management, and development of common critical physical and virtual.

APP interest: Astrophysics Cosmology and Astroparticle Phyiscs cluster - E-ELT/SKA/ CTA/KM3NET (+ASTRONET,VO, UP TO 15 ME)

# ES: Integrating Activities

## 5. INFRAIA 1-2014/2015: INTEGRATING AND OPENING EXISTING NATIONAL AND REGIONAL RESEARCH INFRASTRUCTURES OF PAN-EUROPEAN INTEREST

(90 ME, 02/09/2014) - Physical Sciences - Starting Communities (up to 5 ME)

a) Science at deep-underground laboratories. This activity aims at achieving a high level of integration of facilities for deep underground fundamental science (e.g. dark matter and neutrino studies) and other interdisciplinary applications by simultaneously establishing common access procedures, promoting the common planning of experiments, and by coordinating technological efforts in order to optimise use and access to resources and to avoid duplication.

b) Integrating gravitational wave research. This activity aims at integrating the communities of researchers studying gravitational waves and their astrophysical sources: both laser and atom interferometers with their extreme technological requirements; observations of gravitational-wave sources through electromagnetic waves and high-energy particles; numerical/theoretical studies of such sources. It should address also the computing and data handling needs of these communities.

c) European laboratory astrophysics. Laboratory Astrophysics is a rapidly growing field, not least because the knowledge of fundamental physical properties and processes at nuclear, atomic and molecular levels is crucial for the interpretation of data from ground- and space-based observatories as well as solar-system probes. This activity aims at coordinating and integrating joint efforts of separate laboratories, for all aspects of generation, collection, distribution, curation, and access to data or samples. Links with the respective ESFRI projects in astrophysics (like CTA and SKA) should be established.

d) Research infrastructures for high-energy astrophysics. This activity aims at opening up existing facilities for developing, calibrating and testing both generic technologies as well as individual instruments developed for space missions in an environment representative of space conditions. Access should be provided in particular to scientists without national access to testing and calibration facilities, at the same time stimulating scientific and technological exchanges among European teams.

# ES: e-infrastructures

## 6. EINFRA 1-2014 – Managing, preserving and computing with big research data (55 ME, 02/09/2014)

- Development and deployment of integrated, secure, permanent, on-demand service-driven and sustainable e-infrastructures (incorporating advanced computing resources and software) need to provide services cutting across a wide-range of scientific communities and addressing a diversity of computational requirements, legal constraints and requirements, system and service architectures, formats, types, vocabularies and legacy practices of scientific communities that generate, analyse and use the data.
- Proposals should address at least one of the first five (5) activities, or activities 6, 7 or 8 individually.

1. Establishing a federated pan-European data e-infrastructure to provide cost-effective and interoperable solutions for data management and long-term preservation;
2. Services to ensure the quality and reliability of the e-infrastructure, including certification mechanisms for repositories and certification services to test and benchmark capabilities in terms of resilience and service continuity of e-infrastructures;
3. Federating institutional and, if possible, private data management and curation tools and services used across or at some point of the full data lifecycle, including approaches for identification of open data sources and data collected with sensitive or restricted access features;
4. Large scale virtualisation of data/compute centre resources to achieve on-demand compute capacities, improve flexibility for data analysis and avoid unnecessary costly large data transfers.
5. Development and adoption of a standards-based computing platform (with open software stack) that can be deployed on different hardware and e-infrastructures (such as clouds providing infrastructure-as-a-service (IaaS), HPC, grid infrastructures…) to abstract application development and execution from available (possibly remote) computing systems;
6. Support to the evolution of EGI (European Grid Infrastructure) …
7. Proof of concept and prototypes of data infrastructure-enabling software (e.g. for databases and data mining) for extremely large or highly heterogeneous data sets scaling to zetabytes and trillion of objects.
8. Enable the creation of a platform and infrastructure for mining text aggregated from different sources/publishers….

APP interest: Discussions with CERN and Astronet.

# ES: e-infrastructures

## 7. EINFRA 9-2015 – e-Infrastructures for virtual research environments (VRE) (42ME, 14/01/2015)

- Support capacity building in interdisciplinary research communities to empower researchers through development and deployment of service-driven digital research environments, services and tools tailored to their specific needs. These virtual research environments (VRE) should integrate resources across all layers of the e-infrastructure (networking, computing, data, software, user interfaces), should foster cross-disciplinary data interoperability and should provide functions allowing data citation and promoting data sharing and trust.

- The VRE proposals should clearly identify and build on requirements from real use cases, e.g. for integration of heterogeneous data from multiple sources and value-added services for computing, modelling, simulation, and data exploration, mining and visualisation, taking due account of privacy aspects. They should re-use tools and services from existing infrastructures and projects at national and/or European level as appropriate.

- Each VRE should abstract from the underlying e-infrastructures using standardised building blocks and workflows, well documented interfaces, in particular regarding APIs, and interoperable components. Over time VREs will be composed of generic services delivered by e-infrastructures and domain specific services co-developed and co-operated by researchers, technology and e-infrastructure providers, and possibly commercial vendors.

APP interest: Discussions with ASTRONET for virtual observatory

# ES: Marie Skłodowska Curie Actions (MSCA)

## 8. MSCA Innovation Training Networks (ITN) (405 ME, 09/04/2014,of which 25 ME EID, 30 ME EJD), ESR up to 540 months, for a maximum 48 month duration)

- Innovative Training Networks (ITN) aim to train a new generation of creative, entrepreneurial and innovative early-stage researchers (ESR, 3 to 36 months, No doctorate or <4 years research experience). “Triple i dimension”: international, interdisciplinary and intersectoral mobility combined with an innovation-oriented mind-set.

APP interest:

1. Underground physics: multidisciplinarity in underground labs (very advanced with APPEC help)
2. Theory ( ideas in PACT)
3. GPUs ? Underwater physics ? Photodetection network (CTA,AUGER, KM3NEt) ? Bolometer matrices ? (CMB, DM) Gravitational waves ?

## 9. MSCA-COFUND, (80 ME, 02/10/2014, of which 30 ME for doctoral programs)

1. Cofunding of Fellowship programmes: fund individual research training and career development fellowships for experienced researchers. Regular selection rounds following fixed deadlines or regular cut-off dates, allowing fair competition between the researchers applying.

APP interest: An APPEC COFUND scheme (up to 20% of the COFUND is for common actions): e.g. IDAPP – European Graduate School/ IDPASC

# ES: Future and Emerging Technologies (FET)

## 10. FETOPEN 1 (77 ME, 30/09/2014)

Proposals are sought for collaborative early-stage research projects on any new technological possibility with all of the following characteristics/gatekeepers:

1. Long-term vision: the research proposed must address a new, original or radical long-term vision of technology-enabled possibilities that are far beyond the state of the art and currently not anticipated by technology roadmaps.
2. Breakthrough S&T target: research targets concrete and ambitious breakthroughs that are arguably crucial steps towards achieving the long-term vision and are plausibly attainable within the life-time of the project.
3. Foundational: the breakthroughs that are envisaged are foundational in the sense that they can establish a basis for a new line of technology not currently anticipated.
4. High-risk: the potential of a new technological direction depends on a whole range of factors that cannot be apprehended from a single disciplinary viewpoint. Thus, this high-risk has to be countered by novel concepts and ideas, and by a strongly interdisciplinary research approach, where needed expanding well beyond the strictly technological realm
5. Novelty: the research proposed finds its plausibility in new ideas and concepts, rather than in the application or incremental refinement of existing ones.
6. Interdisciplinary: the proposed collaborations are interdisciplinary in the sense that they go beyond current mainstream collaboration configurations in advanced science and technology research, and that they aim to advance different scientific and technological disciplines together and in synergy towards a breakthrough.

APP interest:

- Gravitational waves: Bottom up-approach, but possible subjects squeezing, high power fiber CW lasers, dielectric coatings, adaptive optics …,
- Underground physics: Liquid argon, Fast low power ADCs, GHz-DAQ? Electronics (chip development + mass production),
- Photosensors – photonics (Photonics, HAMAMATSU, Russian, Electron Tubes, Chinese, FBK [CTA],...),
- Bolometer matrices, TES,KIDS,…
- Communication systems sensor networks (cooperation with commercial companies), Space technology

## ES:: APPEC centralised ACTIONS

### 11. INFRASUPP-1–2014 - INNOVATION SUPPORT MEASURES (2 ME, 02/09/2014)

•To stimulate innovation both from within the research Infrastructures themselves and in their supplier industry

APP interest: A network of knowledge transfer experts by APPEC, CERN+ESO?

### 12. INFRASUPP-6 - 2014 – INTERNATIONAL COOPERATION FOR RESEARCH INFRASTRUCTURES (7 ME, 02/09/2014)

•Facilitate the development of global research infrastructures and the cooperation of European RI with their non-European counterparts, ensuring their global interoperability and reach, and to pursue international agreements on the reciprocal use, openness or co-financing of infrastructures, on the basis of the recommendations of the Group of Senior Officials on Global Research Infrastructures;

APP interest: A global network on large infrastructures to be built by APPEC

### 13. ISSI.1.2014 Public outreach (10 ME, 02/10/2014)

•This topic will organise public outreach exhibitions and participatory events throughout the whole of Europe to engage citizens in science, drawing on the experience and capacity of science museums, Higher Education Institutions, science shops, scientific centres of excellence and innovation hubs, cities of scientific culture (e.g. building on the Seventh Framework programme PLACES initiative), but also grass root Do It Yourself (DiY) creative re-use communities (like movements, etc.), secondary schools, higher education centres, Non-Governmental Organisations (NGOs) and civil society organizations, local public authorities and other relevant stakeholders

APP interest:A network of outreach officers (+CERN+ESO?, up to 3 ME each project)

# ES: 14. ERANET –COFUND (individual R&D calls)

- ERA-NET COFUND: Top-up (33%) funding of individual joint calls for transnational research and innovation in selected areas.
- Multiple joints calls in an variable geometry with individual grant agreements for each call.
- Large initiatives with major strategic research agendas might propose a series of call topics for which top-up funding could be provided.
- FLAT COST 12 KE/YEAR/PARTNER FOR COORDINATION
- No separate budget, a lot of lobbying in order to set it up.
- The proposal from the instrumentation group:
  1. Photodetectors
  2. Lasers/mirros
  3. Cryogenics detectors

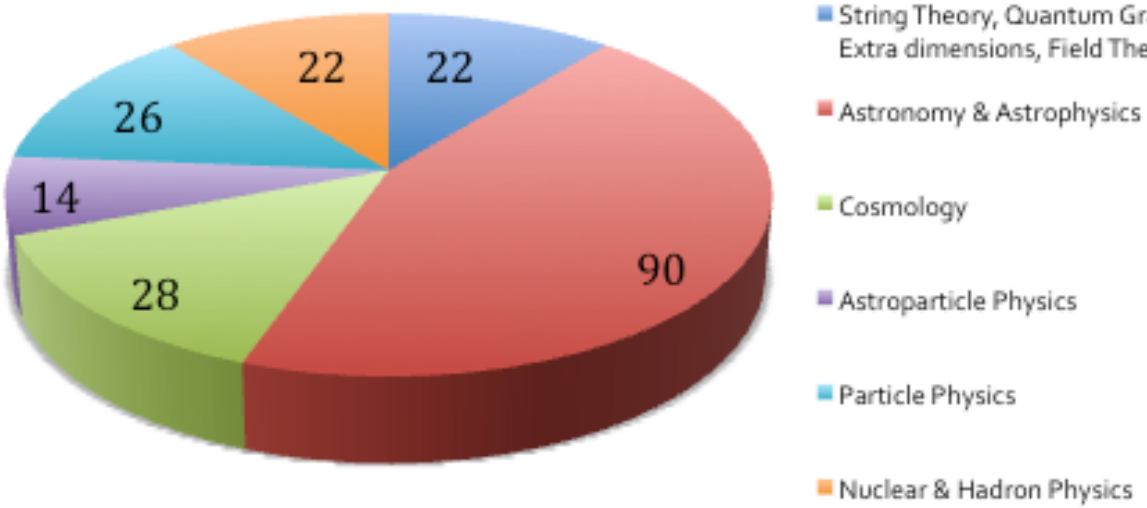
## ES: 15. ERC grants (increase of budget wrt FP7 by 70%)

- **Starting (1.5ME/5years) 25-03-2014**
- **Consolidator (2ME/5years) 20-05-2014**
- **Advanced (2.5 ME/5years) 21-10-2014**

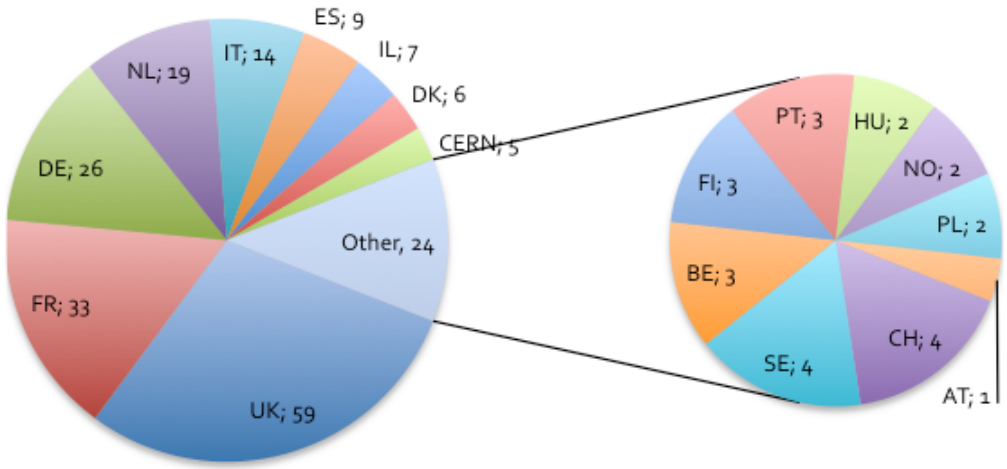
| | Starting Grant | Consolidator Grant | Advanced Grant |
|---|---|---|---|
| **Specific Eligibility Criteria** | Principal Investigator shall have been awarded his/her first PhD<br>≥ 2 and ≤ 7 years<br>prior to the publication date of the call for proposals of the ERC Starting Grant | Principal Investigator shall have been awarded his/her first PhD<br>> 7 and ≤ 12 years<br>prior to the publication date of the call for proposals of the ERC Consolidator Grant | none |

# Astroparticle Physics European Consortium

## A statistical study of ERCs (202 P2I projects in first 10 calls)




blue, projects funded under the Advanced Grants scheme are shown in red)




| Panel | Acronym: full title | Principal Investigator | Host Institution | Host Country | EC funding (k€) |
|---|---|---|---|---|---|
| FCM | MANITOP: Massive Neutrinos: Investigating their Theoretical Origin and Phenomenology | Werner Rodejohann | Max Planck Gesellschaft | DE | 790,8 |
| | RareNoise: . Low-probability, large fluctuations of the noise in detectors of gravitational waves | Livia Conti | Istituto Nazionale di Fisica Nucleare (INFN) | IT | 1000 |
| | TREX:. Novel Developments in TPCs for Rare Event Searches in Underground Astroparticle Experiments | Igor Garcia Irastorza | Universidad de Zaragoza | ES | 1220 |
| | WIMPs KAIROS: The Moment of Truth for WIMP Dark Matter | Gianfranco Bertone | Centre national de la recherche scientifique (CNRS) | FR | 1250 |
| | darkfrontier: Fundamental Physics at the Low Background Frontier | Jocelyn Monroe | Royal Holloway and Bedford New College | UK | 1060 |
| | neutrinoSNO+: Probing fundamental properties of the neutrino at the SNO+ Experiment | Jeanne Rachel Wilson | Queen Mary and Westfield College | UK | 1350 |
| | SAGNACSPEEDMETER: Interferometry beyond the Standard Quantum Limit using a Velocity Sensitive Sagnac Interferometer | Stefan Hild | University of Glasgow | UK | 1399 |
| | LUCIFER: Low-background Underground Cryogenic Installation For Elusive Rates | Fernando Ferroni | Istituto Nazionale di Fisica Nucleare (INFN) | IT | 3290 |
| | SOX: Short distance neutrino Oscillations with BoreXino | Marco Pallavicini | Istituto Nazionale di Fisica Nucleare (INFN) | IT | 3452 |
| US | LEAP: Large European Array for Pulsars | Michael Kramer | University of Manchester | UK | 2460 |
| | LOFAR-AUGER: From Black Holes to Ultra-High Energy Cosmic Rays: exploring the Extremes of the Universe with Low-Frequency Radio Interferometry | Heino Falcke | Radboud Univ Nijmegen - Stichting Katholieke Universiteit | NL | 3460 |
| | CMR: Cosmic ray acceleration, magnetic field and radiation hydrodynamics | Anthony Raymond Bell | University of Oxford | UK | 900 |
| | DARK: Dark Matters | Joseph Ivor Silk | Universite Pierre et Marie Curie | FR | 2500 |
| INTER DISCIP LINARY | NewDark: New Directions in Dark Matter Phenomenology at the TeV scale | Marco Cirelli | Centre national de la recherche scientifique (CNRS) | FR | 1462 |
| | ***TOTAL FUNDING*** | | | | 25593,8 |

Study by N. Augé and B. Saghai in APPEC newsletter

CAUTION :

- European Commission will soon need experts to evaluate first Horizon 2020 proposals.
- Astoparticle physics often difficult to evaluate due to its interdisciplinary nature.
- H2020 call for expression for interest for for individual experts and for organisations to suggest experts was published in OJ C342 of 22 November 2013.

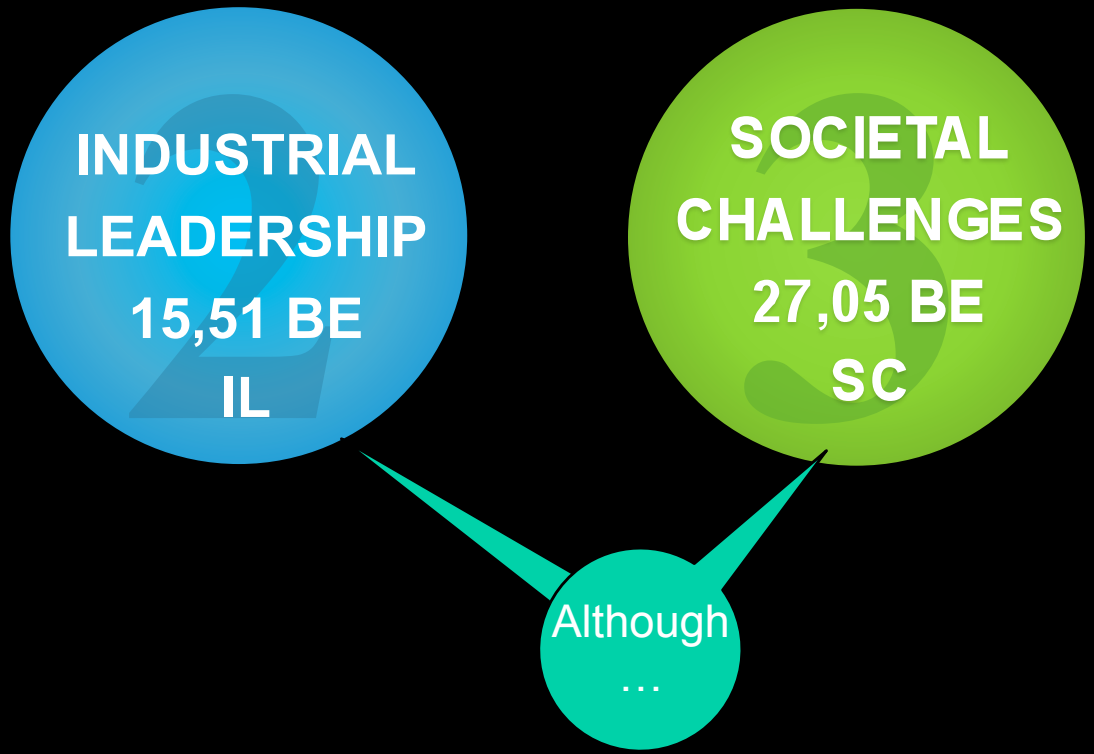
http://ec.europa.eu/research/participants/portal/desktop/en/experts/index.html

➔PLEASE REGISTER

➔APPEC will propose 15-20 senior experts for large programs

# Horizon 2020
# Research and Innovation in three pillars

| Industrial Leadership | Societal Challenges |
|---|---|
| 1) Leadership in enabling and industrial technologies | 1) Health, demographic change and wellbeing |
| 2) Access to risk finance | 2) Bio-economic challenges |
| 3) Innovation in SMEs | 3) Energy |
| | 4) Transport |
| | 5) Climate, resources and raw materials |
| | 6) Inclusive, innovative and reflexive societies |
| | 7) Secure societies |



# IL: Leadership Enabling Industrial Technologies LEIT : closer to implementation and knowledge transfer with industries

# SC: Blue Growth (KM3NET?)

## 16. BG-6-2014 Delivering the sub-sea technologies for new services at sea (82M, first stage 12/03/2014)

- Proposals should address the innovative design of new underwater vehicles and robots and/or their main components required to work undersea. If relevant, proposals could go to the stage of demonstrators or prototypes. The areas of interest are the following:
  - Remotely Operated Vehicles and Subsea Construction systems
  - Specialised 'Robots' and Autonomous Underwater Vehicles, deployment, recovery and docking systems
  - Subsea 'factory' machineries.
- Where relevant, activities should cover the development of European standards.
- The Commission considers that proposals requesting a contribution from the EU in the range of EUR 8–10 million would allow this specific challenge to be addressed appropriately.

## 17. BG-9-2014 Acoustic and Imaging technologies (82M, first stage 12/03/2014)

- Proposals should cover innovative technologies to improve the performance and the cost efficiency of underwater sensors and survey systems needed for acoustic detection, imaging or LiDAR, as well as the (fixed or mobile) platforms supporting them and signal and image processing to interpret raw data. Subsequent use of this information as part of an integrated framework of multi-modal data sources should also be considered.
- Proposals should bring together marine scientists, technology providers and end-users (including policy makers), with a view to support implementation of MSFD, characterisation of good environmental status or to enhance a sustainable European maritime economy.
- The Commission considers that proposals requesting a contribution from the EU in the range of EUR 4–6 million would allow this specific challenge to be addressed appropriately.

# In Summary (from proposition to coordination and advice)

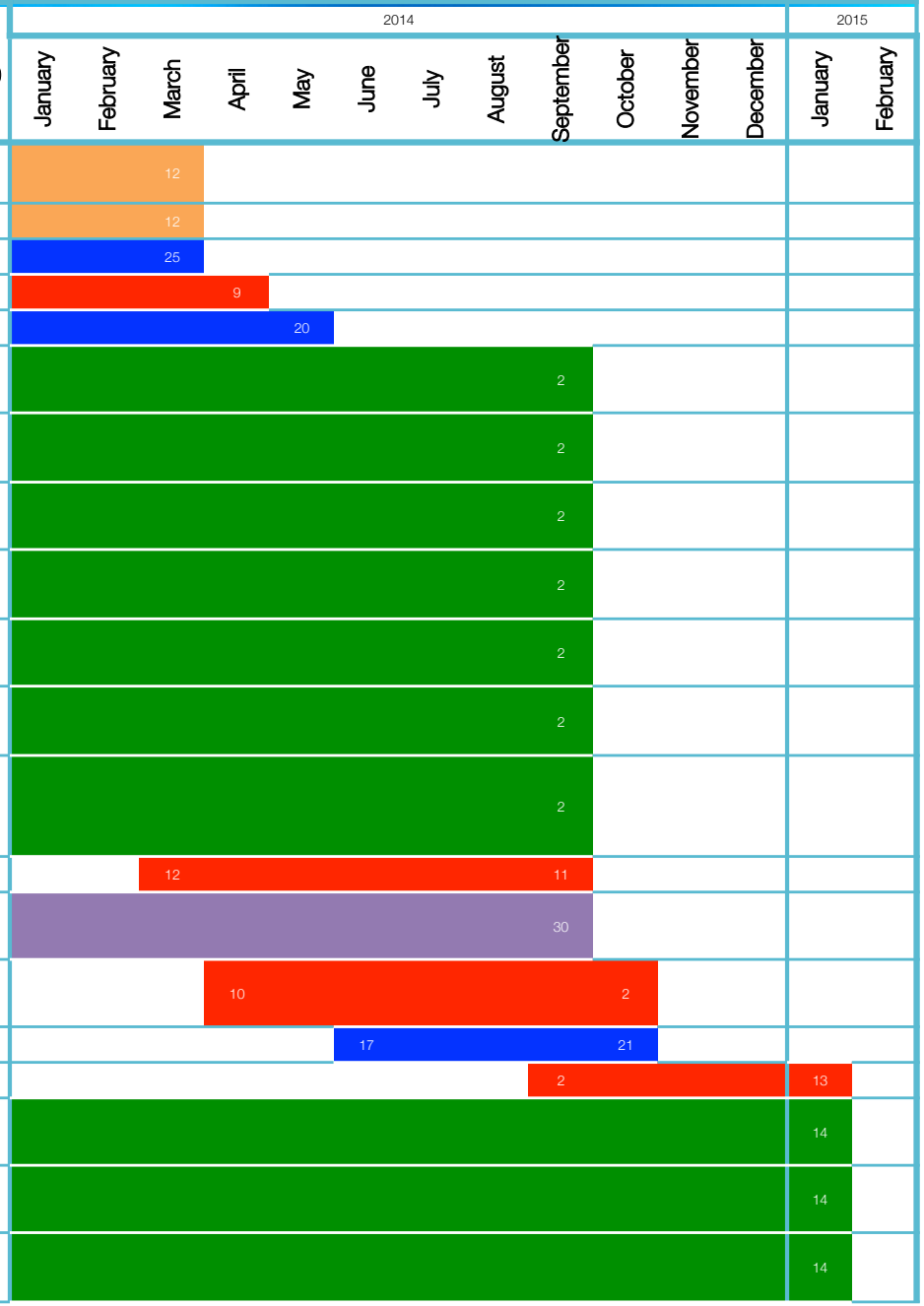
- **APPEC will try to centrally propose:**
  - COFUND scheme
    - for Marie Curie (50% agencies -50% EU )
    - for R&D (ERANET+, 66% agencies -33% EU)
  - Coordination networks (for agencies):
    - International for large research infrastructures
    - Knowledge Transfer (+CERN,ESOASTRONET,…)
    - Outreach (+CERN,ESO,ASTRONET,…)
- **APPEC will help/supervise the coordination by the community for:**
  - One design study (dark matter?)
  - ESFRI projects PP and Implementation
  - CLUSTER (with Astronet)
  - Integrating Activities (Underground labs, Gravitational Antennas,…)
  - e-infrastructures
- **APPEC will provide advice for individual initiatives:**
  - IT Networks, RISE
  - ERC
  - FET and LEIT

Also actions through the NCP network (e.g. content of calls)

APPEC

# Astroparticle Physics European Consortium

| Pillar | Call | Topic Description | Topic Number | Budget (in M) |
|---|---|---|---|---|
| P3 | S2 | DELIVERING THE SUB-SEA TECHNOLOGIES FOR NEW SERVICES AT SEA | BG-6-2014 | 82 |
| P3 | S2 | ACOUSTIC AND IMAGING TECHNOLOGIES | BG-9-2014 | 82 |
| P1 | ERC | STARTING GRANT | H2020-ERC-2014-StG | 485 |
| P1 | MCSA | INNOVATIVE TRAINING NETWORKS (ITN) | H2020-2014-MSCA-ITN | 405,18 |
| P1 | ERC | CONSOLIDATOR GRANT | H2020-ERC-2014-CoG | 713 |
| P1 | RI | DESIGN STUDIES | H2020-INFRADEV-1-2014 | 15 |
| P1 | RI | CLUSTER OF RESEARCH INFRASTRUCTURES | H2020-INFRADEV-4-2014/2015 | 25 |
| P1 | RI | INTEGRATING ACTIVITIES | H2020-INFRAIA-2014-2015 | 140 |
| P1 | RI | MANAGING, PRESERVING AND COMPUTING WITH BIG RESEARCH DATA | H2020-EINFRA-2014-1 | 55 |
| P1 | RI | INNOVATION SUPPORT MEASURES | H2020-INFRASUPP-1–2014 | 2 |
| P1 | RI | INTERNATIONAL COOPERATION FOR RESEARCH INFRASTRUCTURES | H2020-INFRASUPP-6–2014 | 7 |
| P1 | RI | E-INFRASTRUCTURES POLICY DEVELOPMENT AND INTERNATIONAL COOPERATION | H2020-INFRASUPP-7–2014 | 5 |
| P1 | MCSA | INDIVIDUAL FELLOWSHIPS (IF) | H2020-2014-MSCA-IF | 240,5 |
| P1 | FET | FET OPEN | H2020-FETOPEN1–2014/2015 | 77 |
| P1 | MCSA | COFUND | H2020-2014-MSCA-COFUND | 80 |
| P1 | ERC | ADVANCED GRANT | H2020-ERC-2014-AdG | 450 |
| P1 | MCSA | INNOVATIVE TRAINING NETWORKS (ITN) | H2020-2015-MSCA-ITN | 370 |
| P1 | RI | PREPARATORY PHASE | H2020-INFRADEV-2-2015 | 14 |
| P1 | RI | IMPLEMENTATION OF ESFRI INFRASTRUCTURES | H2020-INFRADEV-3-2015 | 90 |
| P1 | RI | E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE) | H2020-EINFRA-2014-9 | 42 |

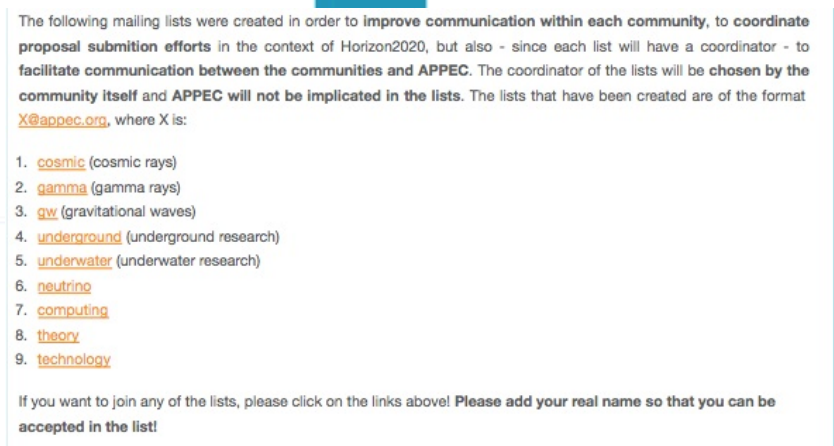


Past and future appointments:

- ✓ GA phone-conference (8 January)
  - ✓ to fix interim convenors of major proposals
  - ✓to nominate senior experts to be proposed to Brussels for large programs
- ✓ COFUND meeting in Brussels (16 January) APPEC directorate
- ✓Meetings:
  - ✓DESY-Zeuthen General Meeting 4-Nov-2013 Starting event for APPEC
  - ✓ *General Meeting (27-28 February) organised around the circa 20 topics of interst to Astroparticle ➔ towards concrete proposals.*
- ✓*Other meetings:*
  - ✓ SAC meeting Krakow March
  - ✓ Knowledge Transfer experts March
  - ✓ Computing Bologna April
  - ✓ Industry forum Noveber
- ✓ Interagency meeting: Global Neutrino Oscillation Experiment(s) June 23-24 Paris

# Astroparticle Physics European Consortium

## All information in www.appec.org


See also APPEC Guide to H2020