



# Summary and Outlook

*Sijbrand de Jong (APPEC SAC chair)*

# Overview



- Review of this meeting's format

- General remarks

- APP research topics

1. High-energy gamma rays
2. High-energy neutrinos
3. High-energy cosmic rays
4. Gravitational waves
5. Dark matter
6. Neutrino properties
7. Cosmic microwave background
8. Dark energy
9. Multi-probe astroparticle physics

- APP community topics

10. Ecological impact
11. Societal impact
12. Open science and citizen science
13. Human talent management

14. Central infrastructures

- 2017 strategy update elements

- Next steps

- Discussion

- Conclusion

# Thanks to Berlin workshop organisers!!!



- Katharina Henjes-Kunst
- Job de Kleuver & Katrin Link & Julie Epas
- Andreas Haungs & Antoine Kouchner
- All the support students in the characteristic blue shirt
- The summary speakers and other table hosts (together ~1/3 of all of us)
- All active participants

# Review of Berlin meeting's format



- Not as bad as many people feared, appreciated by most people in the end
- Unfortunate that (for all sorts of reasons) there were not more participants
- Nice, stimulating and inspiring environment
- What worked:
  - Much more interaction than in previous APP town meetings
  - Many people got 1-1.5 days behind with their emails
  - Community building, looking over the fence(s)
- What can be improved:
  - Preparation
  - Better explaining the format
  - Inform table hosts of discussion topics well ahead of time

# Homework



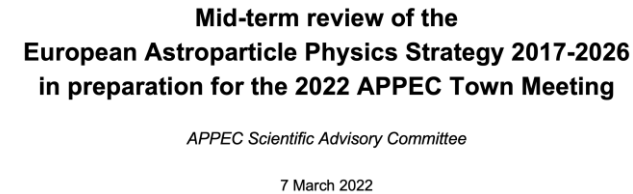
- I will only flash the research topics
- Your homework:
  - Immediately after this talk:
    - Get this presentation from the Indico timetable
  - On your travel home (in the bus, train, plane (not in car or on bike !)):
    - Go over the points that are there because I deem them important to be included
    - Send me your comments/complaints/additions/suggestions/... by email ([Sijbrand@hef.ru.nl](mailto:Sijbrand@hef.ru.nl))
  - This is important !  
Do it. Don't wait until you are drowning in work again on Monday

**As usual, a small number of participants responded: thanks to those !**

# General remarks - Preamble



- SAC midterm review incremental to the 2017 Strategy report
  - Minimal introduction and context
  - Strong support to **theory** goes without saying
  - Similar for computing
- The (APP) world changed again after the midterm review was released
  - Talks between Europe & US about hosting of next generation  $0\nu\beta\beta$  experiments
  - Talking about a transnational access agreement and a collaboration network agreement for Deep Underground Laboratories
  - EuCAPT
  - Pledge from NL to host ET with 870 M€ contribution
  - ...
- There was no attempt in this meeting at a resource loaded plan, need to attempt to do that over the summer (see "what next")



# General remarks



- Theory ! Further empower EuCAPT ?
- Theory <-> experiment connection important, when to share experimental data with theorists ?
- Computing ! Analysis tools (machine learning)
- Specifically highlighting multi-probe was widely endorsed
- Inclusion of community subjects: ecological impact, societal impact, open science and citizen science, and human talent management, was also widely appreciated
- Still heard subjects not addressed yet:
  - APP identity
  - Producing less and better quality papers and notes
  - ...
- Demand for better connect/coordinate with astronomy:  
JENAA (ECFA+NuPECC+APPEC) works well,  
also forge co-operation with European Astronomer (ASTRONET ?)
- Start with the “how we want to work” before the “what we want to do” ?
- Easier prioritization: decouple what need substantial European funding from what does not

# Research

1. High-energy gamma rays
2. High-energy neutrinos
3. High-energy cosmic rays
4. Gravitational waves
5. Dark matter
6. Neutrino properties
7. Cosmic microwave background
8. Dark energy
9. Multi-probe astroparticle physics



CTA top, next ASTROGAM over AMEGO, SWGO over LHAASO  
KM3Net top, also IceCube-Gen2, no priority to P-ONE  
AugerPrime top, also support TAx4, prepare next-gen  
Embrace ET, balance with Virgo, support LISA  
Follow DDMD report, push for 1-2 exps in Europe,  
synergy with other topics, think of direction sensitivity  
Follow  $0\nu\beta\beta$  report, worry about isotope procurement,  
KATRIN top, realise ORCA soon, solar and geo neutrinos ?  
strongly support LiteBIRD, join 4<sup>th</sup> gen ground-based exps  
must-have HW contribution to ground based, Support Euclid  
Distinguish multi-messenger from multi-probe,  
standardisation of alerts and data-exchange (who funds?)  
APPEC should identify time-lines for exps



# Community



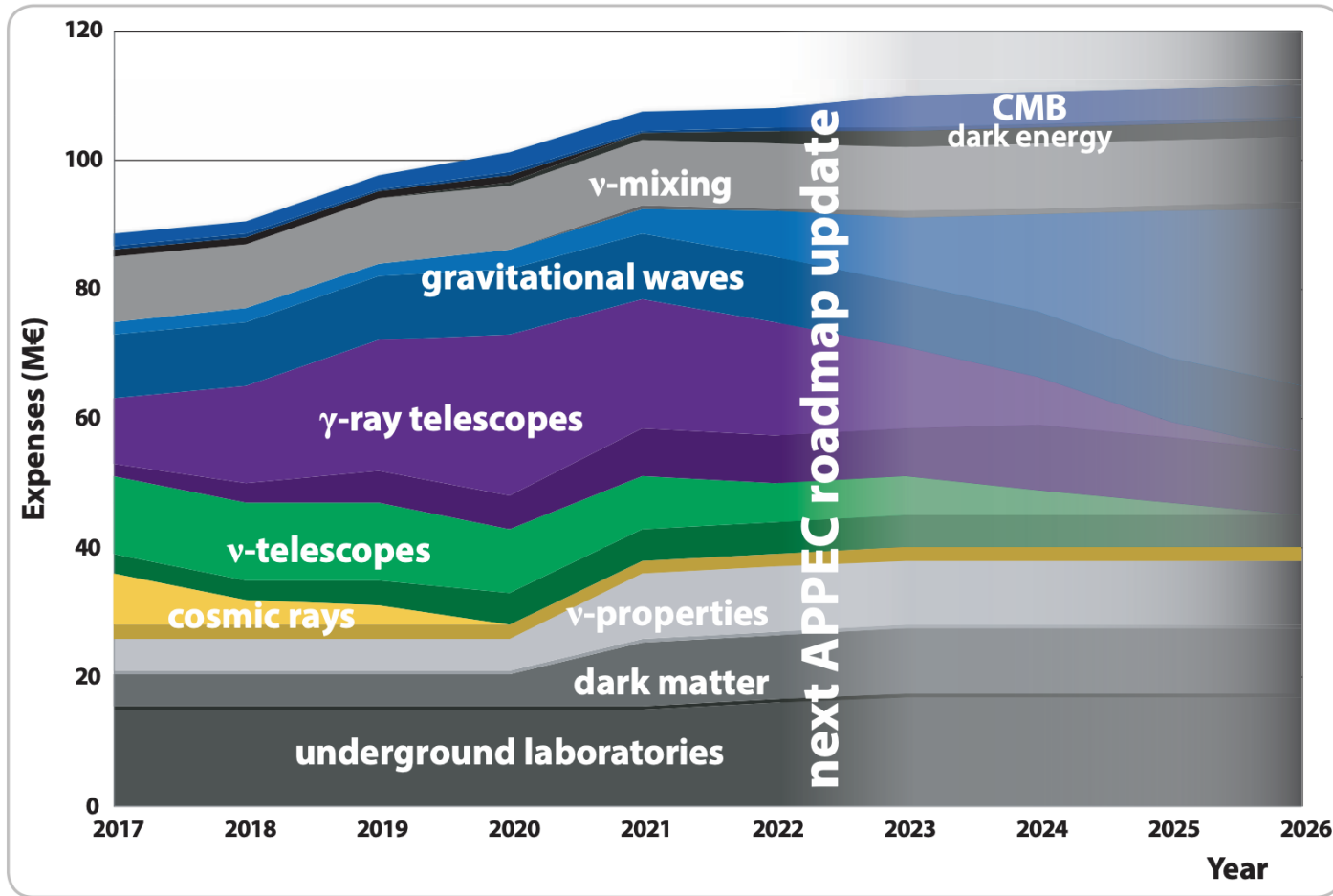
- 10. Ecological impact awareness, monitoring, mitigation/compensation  
APPEC's role in standardisation
- 11. Societal impact Education, culture, regional development, industry, science for peace
- 12. Open/citizen science Findable, Accessible, Interoperable, (Re)Usable, laymen's help vs outreach, Citizens help in analysis ?
- 13. Human talent management APP as community, Diversity Equity & Inclusion, career perspective, education
- 14. Central infrastructures need to coordinate/streamline/collaborate really felt - synergy evident  
Develop a transnational access agreement  
Establish a collaboration network agreement  
Deep Underground Laboratory Integrated Activity (DULIA) as  
EU central structure (?)

# Elements of the strategy update



- Broad consensus that most of the current strategy still ok
  - “Normal” updates as time goes on
- Strong support for including “community” topics – even urges to start the update with it
- Broad support for some change of course:
  - Merging neutrino properties section
  - Prominent place for multi-probe/multi-messenger
    - Need mechanisms for alerts and data exchange
    - Experiment data access by theorists: something to think about more
  - As much interest in the “how” compared to the “what”, think about “moving it up”
  - Make theory more prominent
  - Enhance visibility of computing
- Strengthen the identity of APP and its community, where APPEC can help:
  - Enhance the role of APPEC as coordinator in several areas
  - Several Working Groups suggested
  - Workshops, and training for young APP scientists
  - Give APP a place in education from early age on
  - Call for umbrella organisation for large projects, multi-messenger centre, underground labs,...

# To do: Quantitative understanding ?



Census will be sent out soon

To: - experiments' spokes  
- lab directors

Preparing with Maria Haupt

- Is this in line with what the GA expects ?
- Which experiments to address?

# Next steps



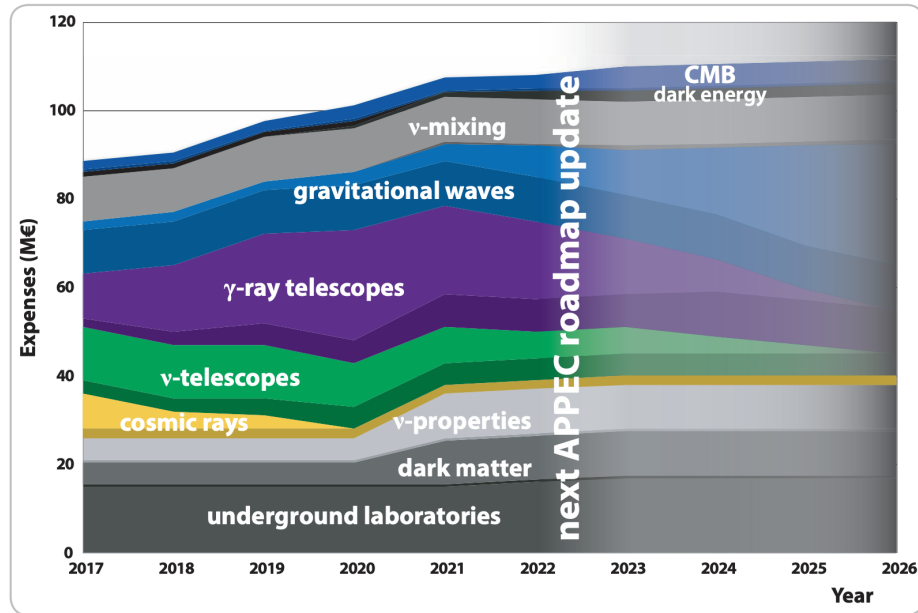
Now - September SAC prepares a draft strategy update

\* Challenge to fit in Citizen Science Workshop result

Condense: shorter text, while being more complete  
more pictures

Attempt at resource loading

(More)  
(written)  
community  
feedback ?  
GA View ?



(Think also of stitching new (e.g. CTA, ET) and current (e.g. HESS/MAGIC/Veritas, Virgo) experiments)

Fall 2022

GA endorses the updates strategy (or not)