

# **Swiss Participation to APIF (Astroparticle Physics International Forum)**

Maurice Bourquin

October 7, 2019

# ORGANISATION of APIF

- OECD GSF established APIF in 2011,
  - following a report summarizing the emerging interdisciplinary field of APP
  - recommending “that a venue be created for consultations of the officials of the funding agencies for the purpose of facilitating a globally coherent response to the scientific opportunities in APP”.
- APIF held twice yearly meetings under chairmanship of Prof. M. Turner :
  - “The best testimony to the value of APIF is the high level and high quality of participation, the willingness of the members to host APIF meetings, and now the great effort put forth to find a new mechanism for the continued existence of APIF.”
- APIF continues as independent structure since 2017, under the “APIF Agreement”, now hosted by Kavli Institute in Stanford, under chairmanship of Prof. R. Blandford (FALC model, no subscription).

# THE ASTROPARTICLE PHYSICS INTERNATIONAL FORUM AGREEMENT, 2017 ONWARDS

Whereas, the Astroparticle Physics International Forum (hereafter APIF) was established by the Global Science Forum (hereafter GSF), a subsidiary body of the Organisation for Economic Cooperation and Development (hereafter OECD), in response to one of the policy recommendations in the OECD GSF Report of the Working Group on Astroparticle Physics of 31 March 2011;

Whereas, as of October 2016, APIF has held 12 meetings biannually on a rotating regional basis, since the first meeting in Paris, April 2011;

Whereas, hosting and support from the GSF to APIF will end on 31 December 2016;

The APIF participants (**see Annex**) have agreed, as follows:

## ARTICLE 1 – SCOPE OF THE AGREEMENT

1. The purpose of this agreement is to establish arrangements for continuing the activities of APIF beyond 2016 on an independent basis.

## ARTICLE 2 – OBJECTIVES OF APIF

**2. APIF serves as a venue for exchange of information and consultation on astroparticle physics, including, inter alia, dark matter, dark energy, cosmic microwave background, high-energy messengers (including charged particles, gamma rays and neutrinos), gravitational waves, proton decay and neutrino mixing, and neutrino mass.**

# THE ASTROPARTICLE PHYSICS INTERNATIONAL FORUM AGREEMENT, 2017 ONWARDS

3. To that effect, APIF serves as a venue for:

Sharing information on the priorities, programs and constraints of different countries, including strategic goals, budgets and project status;

- Making information available to national funding agencies and responsible national bodies on scientific progress, new opportunities and R&D in astroparticle physics;
- **Improving the possibilities for international cooperation by understanding the planning processes, roadmaps and interests of national funding agencies and responsible national bodies in different countries;**
- Promoting knowledge of the applications of the techniques developed for large astroparticle physics facilities, both in other scientific areas and in industry; and
- Considering science policy issues relevant to astroparticle physics, such as access to facilities and data, publishing of results, and management of large facilities.
- ...

## Participation in APIF

“Participation in APIF is open to individuals nominated by **national funding agencies or ministries** with responsibility for astroparticle physics.”

- Present membership includes representatives from US DOE, US NSF, France CEA, France CNRS, INFN, UK Science and Technology Facilities Councils, Netherlands, Chinese Academy of Sciences, Japan, South Korea, Israel, Brazil, South Africa, Spain, India...
  - “outside the presence of scientists who might be tempted to lobby for their areas or projects. “ (M. Turner)
- Switzerland has been represented by SERI
- SERI has informed SCNAT and myself that from now on the responsibility belongs to SCNAT
- SCNAT has designated the Platform MAP, which supports the next APIF meeting (in Japan ,Nov 2019).
- For 2021 on, MAP requests the view of CHIPP

## Items in progress in APIF

- strategic discussions on APP RI's in all member countries
  - Example: CH
  - Example: US DOE
- updates on national priorities and roadmaps, national policies (e.g., open access in publishing and data sharing policies), best practices (e.g., management of intermediate to large international facilities)
- paper on “Benefits of APP to other Sciences and Society”
  - Draft by JW and MB
- document to Japan on developing international RI for HK project
  - Proposal by MB
- Next chair and secretariat
- ...



# **Swiss participation to astroparticle physics experiments**

MB

APIF meeting

May 2019

# 2019 Swiss Roadmap for Research Infrastructures

- The report is updated by SERI every four years in preparation for the ERI (Education, Research and Innovation) Dispatch.
- Concerning astroparticle Physics:
  - XENONnT (8t liq Xe) and DARWIN (commissioning in 2015)
  - Data Center for astronomy, astroparticle physics and cosmology (CDCI)
  - “Being studied” :
    - CTA
    - SKA
    - Neutrino experimental facilities in USA (LBNF-DUNE) and Japan (HyperK), for neutrino beams, proton decay, neutrinos from atmosphere and supernovae.
    - “SERI foresees a special contribution from Switzerland to CERN for the activities related to the LBNF/Dune experiment involving Swiss groups”.





U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

# DOE/HEP Program and Budget Update

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APIF meeting

October 11-12, 2018

*Kathy Turner*

*Office of High Energy Physics*

# Cosmic Frontier Program

Study dark energy through staged program of complementary surveys (in partnership with NSF-AST)

- ▶ **Imaging surveys map cosmic structure over vast volumes of space:** *Dark Energy Survey (DES)* operating, *Large Synoptic Survey Telescope (LSST)* camera in fabrication
- ▶ **Spectroscopic surveys build deep, 3D maps of cosmic structure and growth:** *eBOSS* operating, *Dark Energy Spectroscopic Instrument (DESI)* in fab

Search for dark matter through direct detection experiments over a wide mass range (in partnership with NSF-PHY)

- ▶ **High- and low-mass WIMP sensitivity:** *LZ* and *SuperCDMS-SNOLAB*, in fab
- ▶ **Axion (ultralow mass) experiment:** *ADMX-G2* in operation

Study cosmic acceleration (inflation) at energies near the Planck scale and neutrino properties through the cosmic microwave background (CMB) (in partnership with NSF)

- ▶ **New generation South Pole experiment:** *SPT-3G* in operation
- ▶ **Next generation array 10x more sensitive:** *CMB-S4* in planning

Explore the unknown, e.g. through high energy particles from dark matter annihilations in cores of galaxies (in partnership with NSF, NASA)

- ▶ **Cosmic- and gamma-ray detectors on Earth and in space:** *HAWC*, *Fermi/GLAST*, *AMS* in operation



# Benefits of Astroparticle Physics to Other Sciences and Society

**DRAFT DECEMBER 4, 2018**~~August 23, 2016~~

**Maurice Bourquin and Jim Whitmore**

## Introduction

Astroparticle physics (ApP) is the study of particles and radiation from outer space, and of rare, cosmologically-significant elementary particle reactions. It addresses fundamental questions about the Cosmos, but also excites public interest to science, motivates global coordination through the scale and the complexity of its large research infrastructures, and promotes new technologies and high level quality assurance procedures [1]. The scales of distance examined range from the realm of elementary particles to the outer reaches of the observable Universe, placing the field at the intersection of cosmology, astrophysics, particle physics and nuclear physics.

Astroparticle physics research transfers knowledge to adjacent fields and industry, e.g. large monitoring networks, handling of large data sets, state of the art sensors; ApP research infrastructures are public research initiatives promoting large scale industrial realizations (mirrors, sensor matrices, large volume vacuum, autonomous distributed acquisition, large underwater systems, ...); they are also sustaining a network of smaller industrial partners with high-level niche technologies and know-how.

# Recommendation by APIF to the Japan Hyper K project on the optimal process for obtaining international funding.

1. Concerning the request of Professor Takaaki Kajita about APIF's advice on "expanding the Hyper-Kamiokande project's international collaboration and getting higher confidence for foreign contributions" APIF could propose that, in the process of contacting foreign funding agencies, it is stated that the host institution would adhere to the recommendations set out in the OECD Global Science Forum document **"Strengthening the effectiveness and sustainability of international research infrastructures"** ( [https://www.oecd-ilibrary.org/science-and-technology/strengthening-the-effectiveness-and-sustainability-of-international-research-infrastructures\\_fa11a0e0-en](https://www.oecd-ilibrary.org/science-and-technology/strengthening-the-effectiveness-and-sustainability-of-international-research-infrastructures_fa11a0e0-en)).

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# Switzerland in APIF

- **Benefits:**
  - Production of a twice yearly report on APIF activities, in particular plans from funding agency sources on APP.
    - Ex: US- DOE, NSF, China, Japan, South Korea, Latin America,...
    - Essential for SCNAT new roadmap responsibilities
  - Reports on visits to astroparticle physics facilities
    - Ex: LHASSO
  - International visibility for Swiss particle physics and astrophysics research and research management
    - Ex: «2019 Swiss Roadmap for Research Infrastructures»
    - Ex: the OECD Global Science Forum document “**Strengthening the effectiveness and sustainability of international research infrastructures**”
    - Ex: application of SCOAP3 Open Access policy to APP ???
- **Cost:** no subscription, 2 meetings/year