About policies for multi-wavelength / multi-messenger astrophysics

The New Era of Multi-Messenger Astrophysics Workshop
Gröningen, 27 Mar 2019

D. Mourard – S. Matheussen

Introduction

Review the current MW/MM landscape

Derive some recommendations on how to harmonize joint and efficient scheduling, operation and interoperability of the various telescopes

Produce actionable outcomes in key policy areas

The review covered four main strategic topics:

1/ Joint time allocation,

2/ observing strategies for MM/MW campaigns,

3/ data access and sharing, and

4/ general policies of common interest.

The previous steps

1. APF Guidelines

ASTERICS Policy Forum (APF)
Guidelines for the 'Science Case' working groups
Denis Mourard, Saskia Matheussen July 2017

2. Reports from the Science Groups

CTA – ELT – KM3NeT – SKA

3. APF Forum January 2018

4. Oct/Nov 2018: Saskia, Rob, Giuseppe, Denis

Policy Document for MW/MM* Astrophysics

+ Michele Cirasuolo, Paolo Padovani, Simon Berry, Els de Wolf and others through emails

5. Dec 2018: Selected distribution for feedbacks

All Policy Forum Documents on the Asterics Discussion Board

https://www.asterics2020.eu/phpbb/

Review of the Policy document

https://www.asterics2020.eu/phpbb/

- Rationale
- Science case examples
- The issues
  - Limited focus on synergies between Facilities
  - Perception that MW/MM astrophysics is already well-organised
  - Cross domain differences
  - Need for Regional Centres & expertise
- The recommendations
  1) Importance to continue to raise awareness on the MW/MM astrophysics
  2) Towards a stronger communication/coordination of RI: an open forum?
  3) Possible actions for implementing a stronger framework for MW/MM astrophysics

Rationale

Does not intend to elaborate solutions.

Raise awareness of the stakeholders involved

Create a living document in the community to progress on this issue

Recommendations directed towards scientists, research infrastructures, and funding agencies.

Science highlights

ESFRI roadmap + ASTRONET SV/IR + transverses actions

Transverse synthesis of the ten exemplar science cases from the science community of CTA, ELT, KM3NET, and SKA:

- Transient phenomena
- Correlated surveys to advance cosmology, dark matter, and dark energy
- Virtual Observatory-Event and Target of Opportunity
- Common tools (SED, MHD codes), source identification and characterization, facilitated access to archival MW/MM data.
- Necessity of coordination and data-sharing policies, not immediately obvious with respect to the political and managerial constraints.

A critical review of the situation of MW/MM astrophysics today

Limited focus on synergies between Facilities from the outset

Key science objectives for unique science; but no claims for unpredictable/unexpected part of time

Need for complementary views brought by other facilities rarely extensively described

No existing natural platform to discuss complementarities and the added value of exploiting synergies between infrastructures at an early stage.

Perception that MW/MM astrophysics is already well-organised

Key Science Programs clearly in coordinated programs. But very little, or nothing done within the telescope's open time.

Targets of Opportunity (ToO) well developed but for very small amount of time but maybe not sufficient in the future.

Coordinated programs exist (XMM-VLT) but no general framework (like conditional acceptance by TACs) for proposals addressed to multiple facilities.

➔ potential fracture in the community depending on your participation or not to a particular KSP

A critical review of the situation of MW/MM astrophysics today

Cross domain differences

Significant differences between domains, in particular between physics and astronomy

Lack of general knowledge on developments in other domains

Ex: identification of sources, related to different bands, different names, and different classes, despite the progress of VO standards

Need for Regional Centres & expertise

Extreme complexity of modern instruments (operation and data analysis). Increasing data flow

Communication among these centres will be vital for MW/MM astrophysics

Coordination at each national level ?

Recommendations for the future

I Raising awareness

Crucial for scientists, research infrastructures and funding agencies.

But we identified a number of barriers – Recognition of these difficulties (not only technical but often political) is important.

Science is the driver for MW/MM and it is important that scientists keep pushing for solutions. It is key to take responsibility and to continue to raise awareness of the issues we have to deal with.

Recommendations for the future

II Towards an enhanced coordination for the benefit of MW/MM astrophysics

Recognition of the important differences in the nature of the facilities

- Physics experiment and telescopes
- Space missions and ground facilities
- Intergovernmental organisations versus consortium-facilities.

Enhance the detailed communication on the KSP and Analyze the possibilities for coordination in the early phases of development ➔ better description of the parameter's space.

Recent plans for EUCLID and PLATO and ground-based follow-up observations. Electromagnetic counterpart of gravitational waves ➔ More lessons to be learned from both positive and negative aspects.

More energy for an easier access to science-ready data.

This coordination could take the form of an open forum of Research Infrastructure in Astrophysics dedicated to open and set a place for exchanges.

Recommendations for the future

III Possible actions towards an enhanced MW/MM Astrophysics framework

Complexity of the organizations ➔super Time Allocation Committee across the facilities

Reinforce the ToO approach and analyze the pertinence of this model in the growing demand for multi-facility programs.

Develop joint programs between facilities with delegations of time allocation. And TAC to consider conditional approval of proposals submitted to multiple facilities.

Strong recognition of the importance of VO compliance.

Continue the formation on the added-value of VO compliance for all the actors of Astrophysics.

Continue and even further develop the implementation of expertise centres, with a wider communication on the services offered by these centres.

Network to be built, for example to share the business models and the key features towards science-ready data and an easy access to the data.

Distribution List

- ✓CTA
- ✓ELT
- ✓KM3NET
- ✓SKA
- ✓APPEC
- ✓JIVE
- ✓LOFAR
- ✓IRAM
- ✓ALMA
- ✓XMM
- ✓INTEGRAL
- ✓Fermi
- ✓HESS
- ✓MAGIC
- ✓GTC
- ✓TNG
- ✓LIGO
- ✓VIRGO
- ✓IceCube
- ✓ANTARES
- ✓Global Neutrino Network

Main feedbacks

CTA: Science & transients

- Clarification of the definition of expert centres.
- Push to go to « open data and easily accessible data, science-ready data ». But can we go so far?

HESS:

- Internal collaboration but 40% of time for ToO. First XMM-HESS joint call
- Lack of manpower and funding for full release of the high level products.

XMM

- 30% of high priority observations together with other (large) facilities.
- The large amount of joint programs is surly to be traced back to the US community, whereas large parts of the European community still is reluctant to this approach.

- Recommendation that each facility establishes a joint program with XMM-Newton which should later be replace by Athena, after launch. Experience shows that such joint programs are only successful if they go through one TAC only.

And finally

LIGO

- For GWs, very clear that coordination of pointed instruments has great value.

- Balance of coordination and competition is critical.
- Middle ground between a Super-TAC and chaos.
- ENGRAVE is an interesting element in the story and probably merits some reference here

- *« I wish US astronomers were also working more in the direction of coordination. »*

What' next

- Important to continue the communication around the actions developed by Asterics. ESCAPE framework, ++, AHEAD2020 proposal (X-ray & MM) ?

- Next ASTRONET SV+IR: Board of ASTRONET has now the Policy Document in hands