

The New Era of Multi-Messenger Astrophysics

Multi-Messenger Workshop (29 march 2019)

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Discussion forum – Emily Petroff, Gemma Anderson, Saskia Matheussen, CB



Topics

- Standardizing VOEvents and Archives
- Joint Observation Planning and Follow-ups
- Facilitating Data sharing
- Facilitating joint analysis

Which translates into

- possibilities for standardizing VOEvent messages and infrastructure across the transient community ?
- how to implement more flexible operating models for joint or target of opportunity observations of multi-messenger events ?
- how to reconcile the data practices of facilities with the needs of information sharing policies of the multi-messenger landscape ?
- how can we best facilitate joint analysis of MM alerts/events ?

VOEvent and Archives

- Is there a need to standardize event types ((Who, What, WhereWhen, Why, and How) - extending the work on FRBs to cover other Types?

Smaller working groups within transient sub-fields develop a proposed standard to be iterated upon within the wider user base. Once a standard is developed, it can be submitted to the IVOA and published as an IVOA Note.

- FAIR - Findable, Accessible, Interoperable, and Reusable -

VOEvents perform more poorly on metrics related to reuse and findability.

Improving descriptions of the algorithms and criteria used for transient identification as well as providing external links to appropriate papers/pipelines for citation would already provide a big step towards FAIR compatibility.

VOEvent and Archives

- How do we store information in a way that it can be easily extracted and interpreted later ? What types of queries do people want to perform on archived VOEvents? How do we make VOEvent streams findable, as in FAIR data?

Observatories should publish schedule or metadata archives of where they have observed and at what time to query against new VOEvents.

Facilities report their observing plans to be queried later.

- Are there any changes to the VOEvent specification that you would like to see?
Standard source type entries

Joint Observations Planning & Follow-ups

- Sharing the observatory schedule is a very important first step
- Observatories, facilities & scientists should agree upon what data can be shared
- the implementation should be open source -- this makes dissemination much easier
- Telescope schedule should be public
- Standardisation of communication rather than implementation. Software portability requires a large extra effort because of the platform diversity
- New software implementations to coordinate obs. Needs to be open source
- TAC have an important policy role in rapid response. Need to set a max acceptable number of triggers. Filtering of incoming VOEvents to be handled by the science team
→ provide suggestions for observatory transient policies
- How do we assign priority to incoming triggers (e.g. GRB/short GRB/GW/neutrino) ?

Facilitating Data Sharing

MW/MM information is of critical importance to a growing number of research topics.

- Observing coordination and data-sharing policies are not obvious because of political and managerial constraints
- Being able to access the data is key
- It is important that the data provided is science ready
- In some cases immediate data access is needed, but in many cases archival data will be required.
- The data issue has broad attention both in the European context with the European Open Science Cloud, and globally with the UN Open Universe initiative.

Facilitating Joint Analysis

Different scientific teams to bring together their observational resources, data, analysis and modeling tools, and expertise with different instruments, different data formats, different analysis protocols, and different cultures.

How to make the best of such a large pool ?

Facilitating Data Sharing – Discussion topics

- Data access
- Open Data / EOSC / FAIR
- Different facilities, different cultures, different approaches
- Multimessenger platform / broker concept
- Science Ready data / What data products are required ?
- How do we compute data when multiple facilities involved ?
- Data policy, standards
- Availability of open source tools

US initiative

- Institute for Multi-Messenger Astrophysics
a distributed institute for MMA advancement that brings together researchers with different expertise in order to provide cyberinfrastructure that will enable and support critical aspects needed in this era of MMA.

arXiv :1807.04780