

**2nd Astro-COLIBRI
multi-messenger astrophysics
workshop**

Report of Contributions

Contribution ID: 1

Type: **not specified**

MWL+MM emission of GRBs

Monday, November 20, 2023 11:30 AM (30 minutes)

Presenter: GHIRLANDA, Giancarlo (INAF-Osservatorio di Brera)

Session Classification: Introduction

Contribution ID: 2

Type: **not specified**

Multi-messenger transients

Monday, November 20, 2023 10:30 AM (1 hour)

Presenter: BRANCHESI, Marica

Session Classification: Introduction

Contribution ID: 3

Type: **not specified**

MWL/MM emissions of AGN

Monday, November 20, 2023 12:00 PM (30 minutes)

Presenter: OIKONOMOU, Foteini (Norwegian University of Science and Technology (NTNU))

Session Classification: Introduction

Contribution ID: 4

Type: **not specified**

Radio transients

Session Classification: Contributed talks

Contribution ID: 5

Type: **not specified**

Follow-ups in the radio domain

Session Classification: Contributed talks

Contribution ID: 6

Type: **not specified**

Optical surveys: detection of optical transients

Session Classification: Contributed talks

Contribution ID: 7

Type: **not specified**

Follow-ups in the optical domain

Session Classification: Contributed talks

Contribution ID: 8

Type: **not specified**

General ideas and history

Monday, November 20, 2023 4:00 PM (45 minutes)

Presenter: REICHERZER, Patrick (Ruhr-Universität Bochum (RUB))

Session Classification: Astro-COLIBRI

Contribution ID: 9

Type: **not specified**

Current version and features

Monday, November 20, 2023 4:45 PM (45 minutes)

Presenter: DE BONY DE LAVERGNE, Mathieu (IRFU, CEA, Université Paris-Sacla)

Session Classification: Astro-COLIBRI

Contribution ID: **10**

Type: **not specified**

Virtual Observatory

Monday, November 20, 2023 2:00 PM (30 minutes)

Presenter: NEBOT, Ada

Session Classification: MWL+MM platforms

Contribution ID: 11

Type: **not specified**

GCN

Monday, November 20, 2023 2:30 PM (30 minutes)

General Coordinates Network (GCN): NASA's Next Generation Time-Domain and Multimessenger Astronomy Alert System

Abstract:The Gamma-ray Coordinates Network (GCN) is a public collaboration platform run by NASA for the astronomy research community to share alerts and rapid communications about high-energy, multimessenger, and transient phenomena. Over the past 30 years, GCN has helped enable many seminal advances by disseminating observations, quantitative near-term predictions, requests for follow-up observations, and observing plans. GCN distributes alerts between space- and ground-based observatories, physics experiments, and thousands of astronomers around the world. With new transient instruments from across the electromagnetic spectrum and multimessenger facilities, this coordination effort is more important and complex than ever. We introduce the General Coordinates Network, the modern evolution of GCN built on modern, open-source, reliable, and secure alert distribution technologies, and deployed in the cloud. The new GCN is based on Apache Kafka, the same alert streaming technology that has been selected by the Vera C. Rubin observatory. In this talk, we will present the status and design of the new GCN, a tutorial on how to stream alerts, and a vision of its growth as a community resource in the future.

Presenter: RACUSIN, Judith (NASA)

Session Classification: MWL+MM platforms

Contribution ID: 12

Type: **not specified**

TNS (tbc)

Session Classification: MWL+MM platforms

Contribution ID: 13

Type: **not specified**

ASAS-SN SkyPatrol

Tuesday, November 21, 2023 1:30 PM (30 minutes)

The All-Sky Automated Survey for Supernovae (ASAS-SN) began observing in late-2011 and has been imaging the entire sky with nightly cadence since late 2017. A core goal of ASAS-SN is to release as much useful data as possible to the community. Currently our Sky Patrol platforms allow users to retrieve forced photometry light curves or to query any number of the continuously updated light curves from our catalog of over 100 million targets. Our team is constantly adding tools for light curve analysis, and in the near future we are planning to release a tool for users to setup alert systems on given subsets of our targets that can be triggered in real time as we image the sky. As an open source platform, we not only take in recommendations from the community, but also benefit from a number of direct contributions to our code base.

Presenter: HART, Kyle

Session Classification: Brokers and follow-up

Contribution ID: 14

Type: **not specified**

ZTF/LSST brokers (e.g. European Broker Initiative)

Monday, November 20, 2023 3:00 PM (30 minutes)

Presenter: NORDIN, Jakob (Humboldt Universität, Berlin)

Session Classification: MWL+MM platforms

Contribution ID: 15

Type: **not specified**

SkyPortal

Tuesday, November 21, 2023 2:00 PM (30 minutes)

Presenter: JEGOU DU LAZ, Theophile

Session Classification: Brokers and follow-up

Contribution ID: 16

Type: **not specified**

BHTom

Tuesday, November 21, 2023 2:30 PM (30 minutes)

Presenter: WYRZYKOWSKI, Lukasz (Warsaw University Astronomical Observatory)

Session Classification: Brokers and follow-up

Contribution ID: 17

Type: **not specified**

Unistellar + SETI

Tuesday, November 21, 2023 5:30 PM (30 minutes)

Presenter: ESPOSITO, Tom

Session Classification: Citizen science

Contribution ID: **18**

Type: **not specified**

Introduction + topics + group formation

Presenter: SCHÜSSLER, Fabian (IRFU / CEA Paris-Saclay)

Session Classification: Astro-COLIBRI

Contribution ID: **19**

Type: **not specified**

AAVSO

Tuesday, November 21, 2023 4:30 PM (30 minutes)

Presenter: EGGENSTEIN, Heinz-Bernd (AAVSO)

Session Classification: Citizen science

Contribution ID: **20**

Type: **not specified**

RAPAS

Tuesday, November 21, 2023 4:00 PM (30 minutes)

Presenter: MIDAVAINÉ, Thierry

Session Classification: Citizen science

Contribution ID: **21**

Type: **not specified**

iTelescope (tbc)

Session Classification: Astro-COLIBRI

Contribution ID: 22

Type: **not specified**

Welcome

Monday, November 20, 2023 10:00 AM (30 minutes)

Presenters: SCHÜSSLER, Fabian (IRFU / CEA Paris-Saclay); BALKANSKI, Yves (Institut Pascal - UPSaclay)

Session Classification: Introduction

Contribution ID: 23

Type: **not specified**

Kilonova-Catcher

Tuesday, November 21, 2023 3:00 PM (30 minutes)

Presenter: ANTIER, Sarah

Session Classification: Citizen science

Contribution ID: 24

Type: **not specified**

The United Nations Open Universe Initiative

Tuesday, November 21, 2023 5:00 PM (30 minutes)

Presenter: BARRES DE ALMEIDA, Ulisses

Session Classification: Citizen science

Contribution ID: 25

Type: **not specified**

IceCube realtime alerts: science and infrastructure

Tuesday, November 21, 2023 9:00 AM (20 minutes)

In recent years, the IceCube realtime program has been publishing alerts following the detection of neutrinos with moderate-to-high probability of being astrophysical. Such alerts are distributed through the NASA General Coordinates Network in two steps: a prompt notice with preliminary details, followed by a circular containing detailed reconstruction information. In this contribution, I will give an overview of the IceCube realtime activities, focused on the IceCube realtime alert selection criteria and on the ongoing efforts to improve the neutrino directional reconstruction. Finally, I will discuss existing and prospective synergies between the IceCube realtime program and the Astro-COLIBRI platform.

Presenter: LINCETTO, Massimiliano (RUB)

Session Classification: Contributed talks

Contribution ID: 26

Type: **not specified**

Online Analysis Framework for Multi-Messenger Astronomy with KM3NeT

Tuesday, November 21, 2023 9:20 AM (20 minutes)

KM3NeT is a Cherenkov-based neutrino telescope under construction in the depth of the Mediterranean sea. It will consist of two main detectors, ARCA and ORCA, sensitive to energies from MeV to PeV. Presently a fraction of both detectors is already data-taking with a completion date foreseen for 2028.

The telescope design allows for a high duty-cycle, a large field of view, and an unprecedented angular resolution which can be as good as 0.1 deg. To turn that into an asset for multi-messenger astronomy, KM3NeT should be able to identify interesting neutrino candidates and send the relevant information of the reconstructed events in a very short time, allowing for a prompt follow-up of events from transient or variable sources by other observatories. In addition, KM3NeT can provide a follow-up of alerts emitted by partner experiments and be used to refine the position of poorly localized triggers, like gravitational wave alerts.

This contribution reports on the status of the KM3NeT online analysis framework that has been running since October 2022. The current performance for KM3NeT/ARCA and KM3NeT/ORCA detectors together with a summary of the most relevant results will be presented, as well as some of the tasks performed by the WP4.3 team of the KM3NeT-INFRADEV2 project.

Presenter: CECCHINI, Vincent (KM3NeT-INFRADEV2, IFIC Valencia, CSIC)

Session Classification: Contributed talks

Contribution ID: 27

Type: **not specified**

Searching for sub-TeV neutrino counterparts to sub-threshold gravitational wave events

Tuesday, November 21, 2023 9:40 AM (20 minutes)

Since the release of the Gravitational Wave Transient Catalog GWTC-2.1 by the LIGO-Virgo collaboration, sub-threshold gravitational wave (GW) candidates are publicly available. They are expected to be released in real-time as well, in the upcoming O4 run. Using these GW candidates for multi-messenger studies complements the ongoing efforts to identify neutrino counterparts to GW events. This in turn, allows us to schedule electromagnetic follow-up searches more efficiently. However, the definition and criteria for sub-threshold candidates are pretty flexible. Finding a multi-messenger counterpart via archival studies for these candidates will help to set up strong bounds on the GW parameters which are useful for defining a GW signal as sub-threshold, thereby increasing their significance for setting up follow-up searches. Here, we present the current status of this ongoing work with the IceCube Neutrino Observatory. We perform a selection of the sub-threshold GW candidates from GWTC-2.1 and conduct an archival search for sub-TeV neutrino counterparts detected by the dense-infill array of the IceCube Neutrino Observatory, known as “DeepCore”. An Unbinned Maximum Likelihood method is used for this. We report the 90% C.L. sensitivities and 3 sigma discovery potential flux of this sub-TeV neutrino dataset for each selected sub-threshold GW candidate, considering spatial and temporal correlation between the GW and neutrino events within a 1000 s time window.

Presenter: MUKHERJEE, Tista (IAP, KIT)

Session Classification: Contributed talks

Contribution ID: 28

Type: **not specified**

tilepy: rapid tiling strategies in mid/small FoV observatories

Tuesday, November 21, 2023 10:30 AM (20 minutes)

Presenter: SEGLAR ARROYO, Monica (IFIC)

Session Classification: Contributed talks

Contribution ID: 29

Type: **not specified**

Powering Source of Gamma Ray Burst Associated Supernovae: Spin-down Millisecond Magnetar?

Tuesday, November 21, 2023 11:10 AM (20 minutes)

The diversity in the observed properties of different types of supernovae (SNe) are crucial to understanding how the life of stars ends differently. Diversity among underlying powering mechanisms may play a vital role among other possible factors (e.g., progenitor, environment). Unique properties and scarcity of Gamma-ray bursts (GRBs) associated SNe (GRB-SNe) seek attention and are exciting for investigating their underlying powering sources. There are three traditional standard models to explain the properties of most of the SNe; radio-active decay of Ni-56 (RD), spin-down millisecond magnetar (MAG), and ejecta-circumstellar interaction (CSM). A magnetar with a spin period of 1 millisecond, mass of 1.4 solar masses, and radius of 10 kilometers has a rotational energy reservoir of nearly 2.2×10^{53} ergs, hence can explain the light-curves of various types of SNe, including GRB-SNe. With a given opportunity, I would like to talk about how milliseconds magnetars are the most favorable powering sources of GRB-SNe and will discuss the ultimate tools, such as MOSFiT, MINIM, TigerFit, etc., to probe their characteristics.

Presenter: KUMAR, Amit (University of Warwick)

Session Classification: Contributed talks

Contribution ID: 30

Type: **not specified**

Detectability of GRB Optical Prompt and Afterglow with Iranian National Telescope

Tuesday, November 21, 2023 11:30 AM (20 minutes)

Iranian National Observatory Project is a medium size optical telescope with a primary diameter of 3.4m dedicated for observations of galactic/extra galactic and transient sources. The telescope is an optical RC telescope benefitting from on axis Cassegrain focus and side Cassegrain stations. We aim to detect GRB afterglows and optical prompts/ Kilonoveas and the optical counterparts of GW sources with INO and to joint the community of optical follow up observations with ground based telescopes. I will give a report about our telescope and our efforts to prepare for follow up observations including both software and hardware developments.

Presenter: SHAKERI, Soroush (Isfahan University of Technology (IUT))

Session Classification: Contributed talks

Contribution ID: 31

Type: **not specified**

Observing Strategy for Electromagnetic Follow-up of Gravitational-Wave Events

Tuesday, November 21, 2023 10:50 AM (20 minutes)

In the realm of multi-messenger astronomy (MMA), implementing an optimal observing strategy to follow electromagnetic (EM) counterparts across the network observatories is a crucial factor to achieve successful observations. By employing the Multi Order Coverage (MOC) data structure and ranking methods, we present an observing strategy in the context of the GECKOrchester tool. The performance of this strategy is evaluated through its application at the Korean network observatory for ongoing and future observing runs of the Advanced LIGO, Advanced Virgo, and KAGRA collaboration.

Presenter: KHALOUEI, Elahe (Seoul National University)

Session Classification: Contributed talks

Contribution ID: 32

Type: **not specified**

Fermi-LAT analysis platforms: FAVA + LCR

Presenter: VALVERDE, Janeth

Session Classification: Contributed talks

Contribution ID: 33

Type: **not specified**

Conclusions

Friday, November 24, 2023 12:00 PM (30 minutes)

Presenter: SCHÜSSLER, Fabian (IRFU / CEA Paris-Saclay)

Session Classification: Sciathon