Multi-messenger Astrophysics

We are currently witnessing the birth of a new branch of astrophysics: combining information provided by an increasing number of cosmic messengers, astronomers are able to probe deep into the most violent phenomena of the universe. For centuries mankind has used "only" electromagnetic radiation to learn about the heavens above. First in the form of optical light, but soon also using different wavelengths like infrared and radio but also X and gamma rays. Over the last years new and fundamentally different messengers have allowed to complement the picture: high-energy neutrinos are being detected deep in the ice of the Antarctic and the depths of the Mediterranean Sea and gravitational waves are recorded by extremely sensitive laser interferometers.

Transient phenomena

The most violent explosion in the universe are supernovae and gamma-ray bursts (i.e. exploding stars at the end of their lifetime), mergers of binary black holes or neutron stars, stars being disrupted by black holes (i.e. tidal disruption events), bursts of radiation or neutrinos from the central black holes of distant galaxies, and even more exotic and mysterious phenomena like Fast Radio Bursts. They all have in common that they emit radiation, high-energy particles or gravitational waves only in very brief and un-predictable bursts. An ever increasing number of observatories around the world is trying to catch these intriguing signals. We have developed **Astro-COLIBRI** to help us keep track of the rapidly changing transient sky and to optimize dedicated follow-up observations across the multi-wavelength and multi-messenger spectrum.

Web interface

https://astro-colibri.com

Smartphone application

Google Play Store

Apple iOS App Store

Twitter

@AstroColibri

YouTube: Tutorials

Contact

astro.colibri@gmail.com

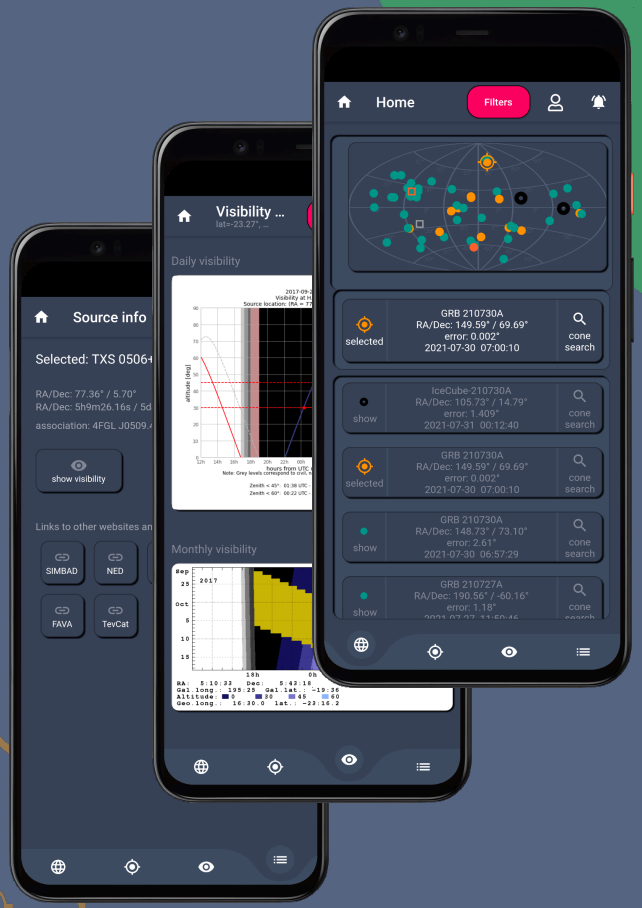
AHEAD 2020

Astro-COLIBRI

A novel platform for professional and amateur astronomers interested in Time Domain Astronomy and Transient Multi-Messenger phenomena

Easy and free to use interfaces: website + smartphone apps

We have set up a high performance and fully automatized cloud computing infrastructure to monitor detection reports of new transient phenomena from observatories around the world. Our system covers all wavelengths and all astrophysical messengers. The resulting overview is made available for free via easy to use interfaces on a website (**astro-colibri.com**) and via smartphone applications available in the Android and iOS app stores.



Follow-up observations and visibility assessment

Dedicated follow-up observations with the largest instruments in the world allow to gather additional observations on the most promising and interesting phenomena. Astronomers use Astro-COLIBRI to prepare these observations.

Find out if you are able to participate in the hunt for transient emission yourself.

Context and additional information

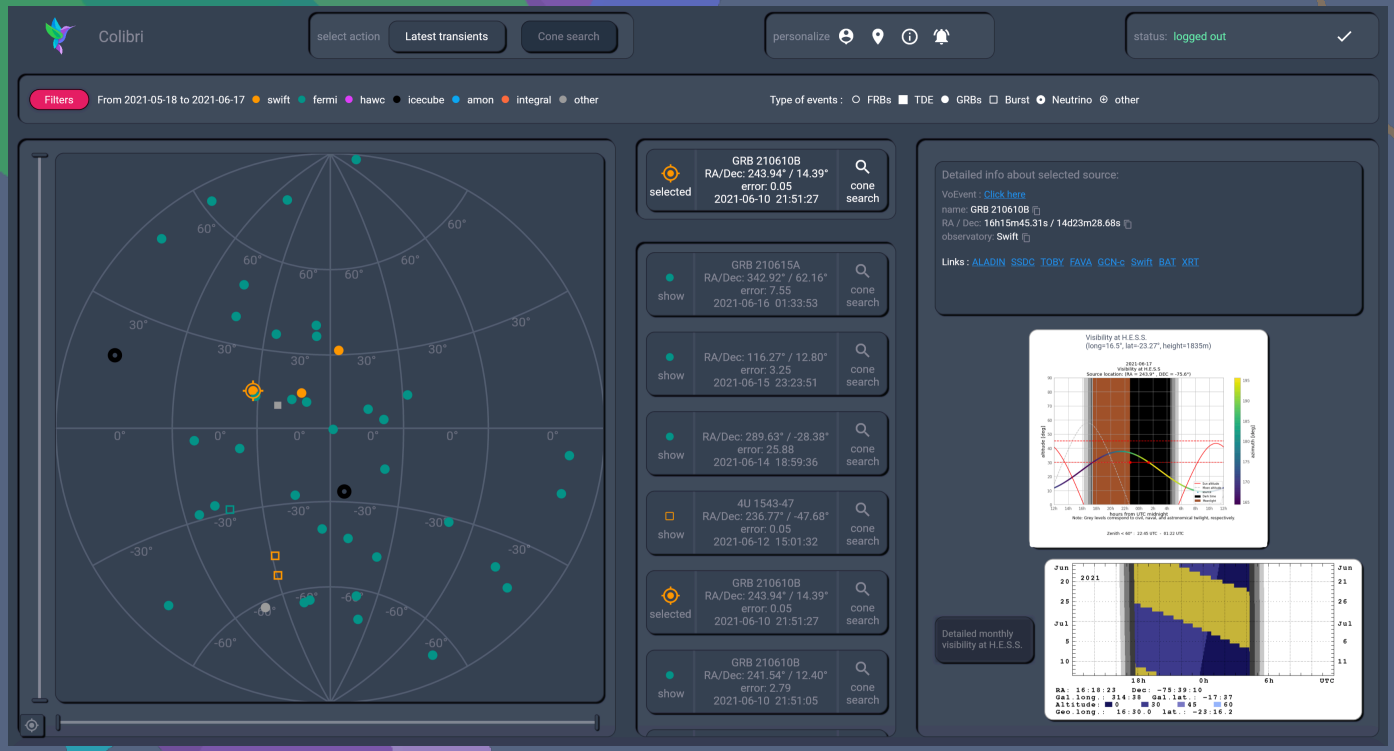
The Astro-COLIBRI interfaces (web/app) provide detailed context information for all transient phenomena.

Feel free to scan through original observation reports, zoom into the region of origin using archival observations, search for associated sources ,study their details and much more.

Real-time alerts and notifications

The smartphone application allows to receive notifications that alert you in real-time of new detections of interesting transient phenomena. Select the phenomena you are interested in (e.g. gamma-ray bursts, neutrinos, gravitational waves, and many more). You now have the chance to follow along in real-time as we discover more and more about the most violent explosions in the universe.

Join the discussion about the details of the observations on Twitter and have a look at the documentation and tutorials on YouTube. A group of professional astronomers is awaiting your feedback and is available to provide further help.



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