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A wide view of the multi-messenger astronomy with Fink, from the detection to the characterisation

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With the advent of optical large-scale astronomical surveys such as the Zwicky Transient Facility (ZTF) or the upcoming Vera C. Rubin Observatory, the number of alerts generated by transient, variable, and moving objects is skyrocketing to millions per night. To handle this influx, the processing of alerts has been delegated to the alert broker such as Fink, which identifies and classifies them for distribution to the scientific community. In multi-messenger astronomy, combining data from various sources like gravitational waves, neutrinos, and the other electromagnetic wavelengths with optical alerts provides a more comprehensive view of astrophysical objects. Fink-MM is the most recent development within the Fink broker that enables real-time multi-messenger transient detection. It merges the Fink alerts stream and General Coordinates Network (GCN) alerts stream via an automated pipeline to detect optical alerts that match in space and time with a GCN alert. Fink leverages cutting-edge computer science to quickly and efficiently filter the large number of alerts within the error box of multi-messenger events, redistributing them publicly to the scientific community. However, Fink-MM only detects multi-messenger candidates and does not help characterize them. Follow-up facilities must be involved for a better sampling of light curves. Additionally, a target and observation manager (TOM) has been developed between Fink and the ground-based network of telescopes used with the SVOM mission. The Fink-TOM manages the GVOM network, comprising Fink and the SVOM ground telescope, to automatically recover alerts from Fink suited for follow-up and manage photometry and spectroscopy follow-up campaigns involving multiple telescopes. The talk will presents Fink-MM and the GVOM network as well as the TOM.

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