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Enhancing neutrino alerts for KM3NeT with multi-wavelength correlation

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The study of celestial transient objects relies on the coordination of different observations. As an increasing number of actors join this coordination, the number of alerts grows rapidly, and each experiment needs to maximize the scientific interest of their public alerts.

KM3NeT is a neutrino telescope consisting of two detectors, ORCA and ARCA, currently under deployment in the Mediterranean Sea. The Real-Time Analysis Platform of KM3NeT, currently in the prototype phase, already performs follow-up neutrino searches at the reception of external triggers, and should start sending public alerts within 2024. Neutrino detectors have thus far considered only neutrino properties (energy, probability of astrophysical origin, etc) for the selection of alerts being broadcasted to the astronomy community.

An additional approach is to also consider the properties of the celestial objects inside the provenance region of neutrinos.
By selecting both on neutrino properties and on the multi-wavelength characteristics of the possible sources of origin, one can improve the chances of follow-up observations and of discovery of transient neutrino sources. This selection would first rely on a correlation with different astronomy catalogs to select the most interestic sources, before refining the selection with the temporal variation of the sources.

As a broker that will process the transient alerts from the Vera C. Rubin Observatory, the Fink broker will be central to retrieve optical lightcurves.
During this contribution, I will present a prototype for this new neutrino selection leveraging the capabilities of Fink.

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