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Enabling discoveries of Solar System objects in large alert data streams

With the advent of large-scale astronomical surveys, such as the Zwicky Transient Facility (ZTF) and the forthcoming Vera
C. Rubin Observatory's Legacy Survey of Space and Time (LSST), the number of alerts generated by transient, variable, and moving
astronomical objects are snowballing, reaching millions of alerts per night. This talk will present Fink-FAT, a third-party module dedicated to the identification of new minor planets of the Solar System integrated with the Fink alert broker real-time operations, which deals with massive alert data streams produced by large-scale surveys. We validated Fink-FAT on ZTF alert packets linked to confirmed Solar System objects from the Minor Planet Center (MPC) database. We extracted orbit candidates using solar system candidates alerts and confronted them with follow-up observations. Despite a much lower efficiency than present linking algorithms, Fink-FAT reaches a high purity level in reconstructing orbits and runs fast, making it suitable for the real-time discovery of new minor planets.

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