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Fink Pair Instability Supernovae classifier

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Pair-instability supernovae (PISN) are stellar explosions marking the end of life of the first generation of stars to exist in our Universe. Despite being theoretically predicted, up to this point there are no confirmed PISN observations.

The ELAsTiCC challenge, which anticipates data to be generated by the Rubin observatory, will contain a significant amount of PISN. We present a PISN module developed for the Fink broker. It is a binary classifier based on a Random Forest algorithm using features extracted from photometric light curves. We explore two types of features, one based on a parametric fit and another constructed from statistical properties of the light curves. We investigate the efficiency of this approach in distinguishing between PISN and other classes of objects within the ELASTiCC data. We also analyse scores from applying our method test data from ELAsTiCC, and discuss necessary modifications for applying it to upcoming LSST data.

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