

## Photometric selection of type Ia SNe: Improving the detection of transient events

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A method for improving the detection of transient events in the photometric approach of the SuperNova Legacy Survey (SNLS) is presented. The SNLS is a second generation survey with a primary goal of determining the equation of state of dark energy using type Ia supernovae (SNe Ia), based on the Canada-France-Hawaii Telescope (CFHT) which collected data between the years 2003-2008. The approach developed by the Saclay SNLS group relies only on photometric data to detect and select SNe Ia providing a larger sample of candidates at higher redshift than the analysis using spectroscopy. The photometric processing of the 3-year data of SNLS gave around 300,000 transient event detections, dominated by saturated signals of bright objects which were not perfectly subtracted. In order to reduce spurious signals for the complete 5-year analysis, we propose a treatment of image stacks used for the detection using Morphological Component Analysis. The method takes advantage on the fact that SNe-like events are circular-like shaped objects at the level of these stacks while spurious detections have different morphologies. Two algorithms were adapted to our case and tested on a subsample of the 3-year data of SNLS, obtaining almost one-third reduction on the number of detections, with only a 7% loss of actual SN candidates.

**Auteur principal:** Mme MÖLLER, Anais (CEA Saclay)

**Orateur:** Mme MÖLLER, Anais (CEA Saclay)

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