

# Rainbow: a colorful approach on multi-passband light curve estimation

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Rainbow is a physically motivated framework which enables simultaneous multi-band light curve fitting. It allows the user to construct a 2-dimensional continuous surface across wavelength and time, even in situations where the number of observations in each filter is significantly limited. Assuming the electromagnetic radiation emission from the transient can be approximated by a black-body, we combined an expected temperature evolution and a parametric function describing its bolometric light curve. These three ingredients allow the information available in one passband to guide the reconstruction in the others, thus enabling a proper use of multi-survey data.

The Vera-C.-Rubin Observatory Large Survey of Space and Time (LSST) will detect 10 million transient events across 6 passbands each night. In this context, Rainbow constitutes a crucial tool to properly and quickly extract meaningful information from the objects. Its ability to exploit measurements from every wavelength allows it to manipulate sparse data and produce much earlier fit than if filters were considered independently. Therefore, feature extractions based on this method create very informative parameter spaces that are the key of good classification.

In this talk I will present the general context, the Fink infrastructure, the Rainbow framework and its advantages for LSST data. Additionally I will show how the method can be used to create/improve photometric classifiers in an efficient way for the Fink broker.

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