LSST Variable Star Classification

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Introduction

Our research focuses on classifying variable stars that will be found by the upcoming Large Synoptic Survey Telescope (LSST). The LSST is a revolutionary project that will survey the sky deeply for 10 years and find a huge number of eclipsing binaries, pulsating variables and other variable stars. We need an efficient way to classify millions of variable stars into the many available classes. This is not something that computers can easily do (on their own). It's also not something that one researcher can do. So we are creating a Zooniverse citizen science project and enlisting thousands of volunteers!

We are presenting light curves and the 'best-fit' period using data from the Caltech Palomar Transient Factory (PTF) database and, later on, LSST data. We are also providing instructions and background information about variable star classification. Our goal is to boil down the complexities of variable star classification into something that citizen scientists will be able to understand and be excited about.

From the data generated by this project, we will have a census of the Milky Way, deeper insight about how stars are born, approximately twice the number of known variables for each of the classes, and an overall better understanding about variable star populations.
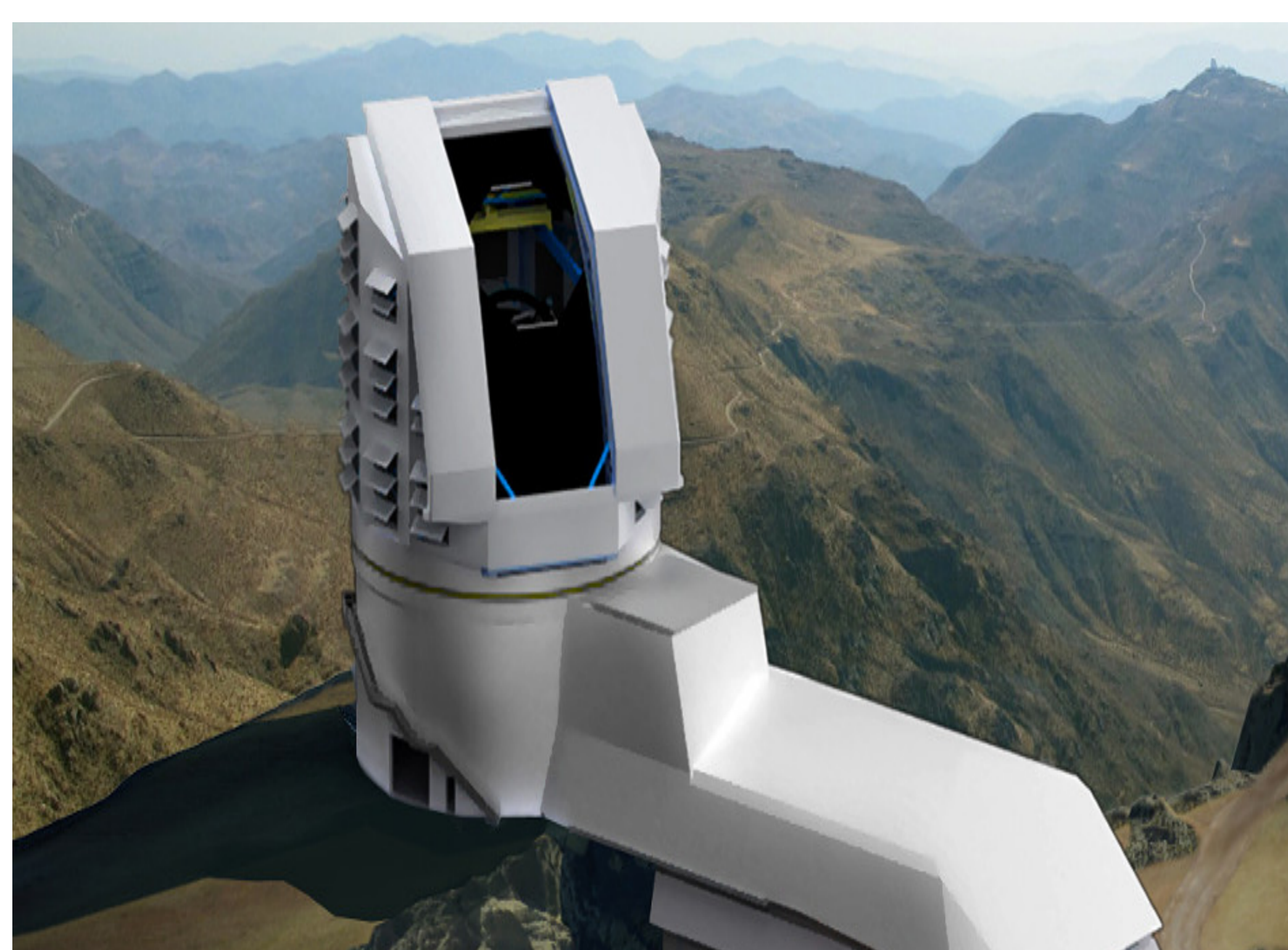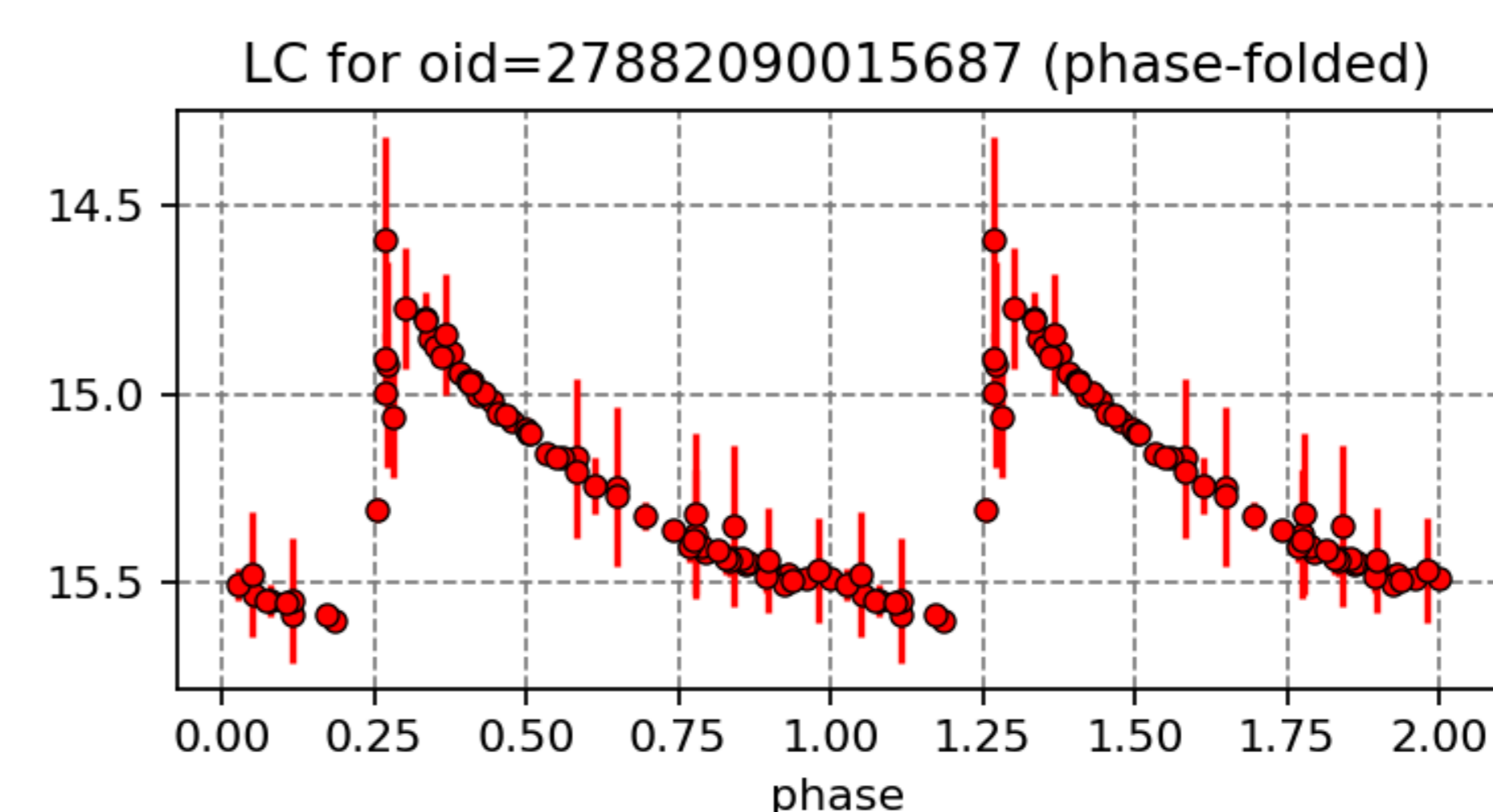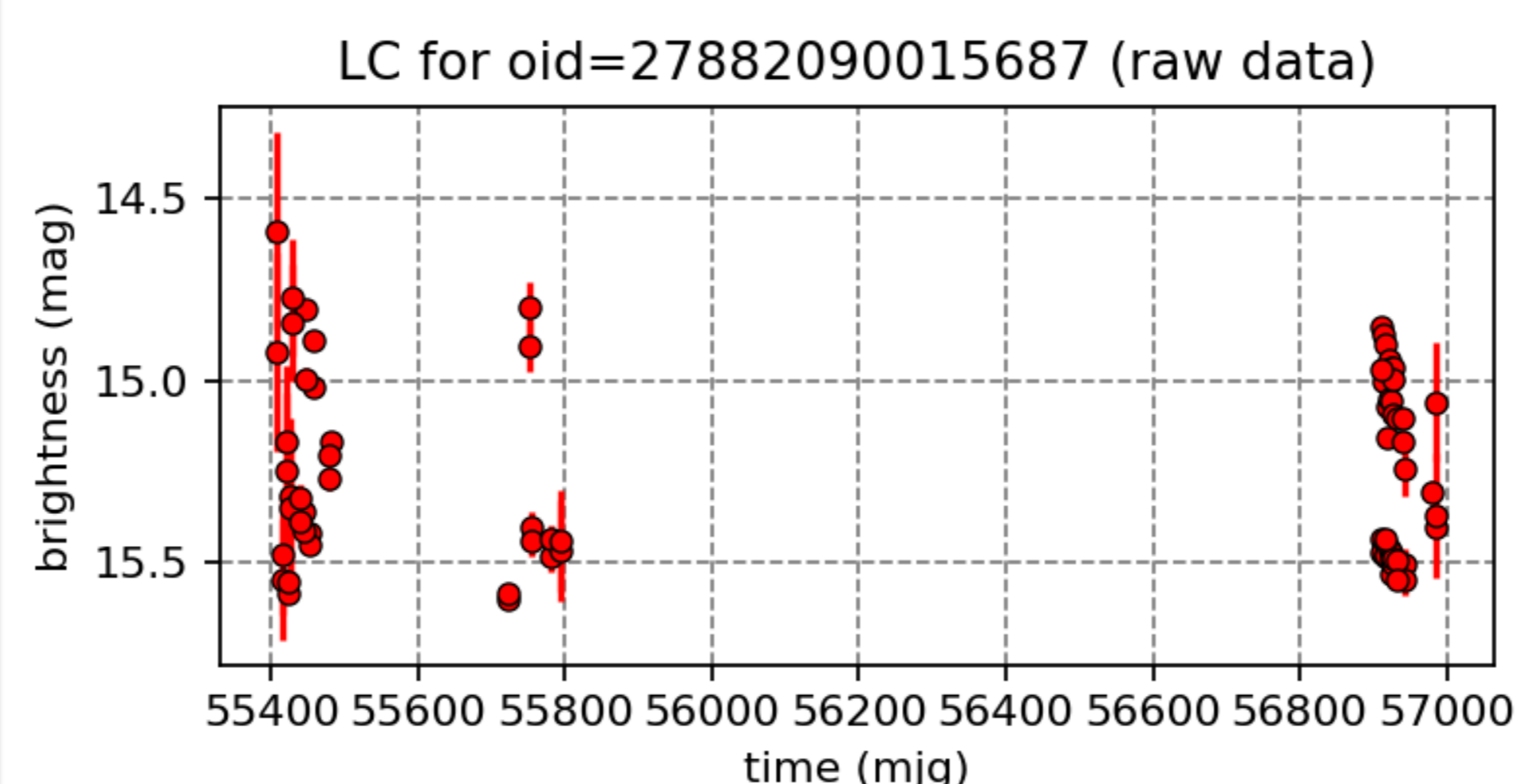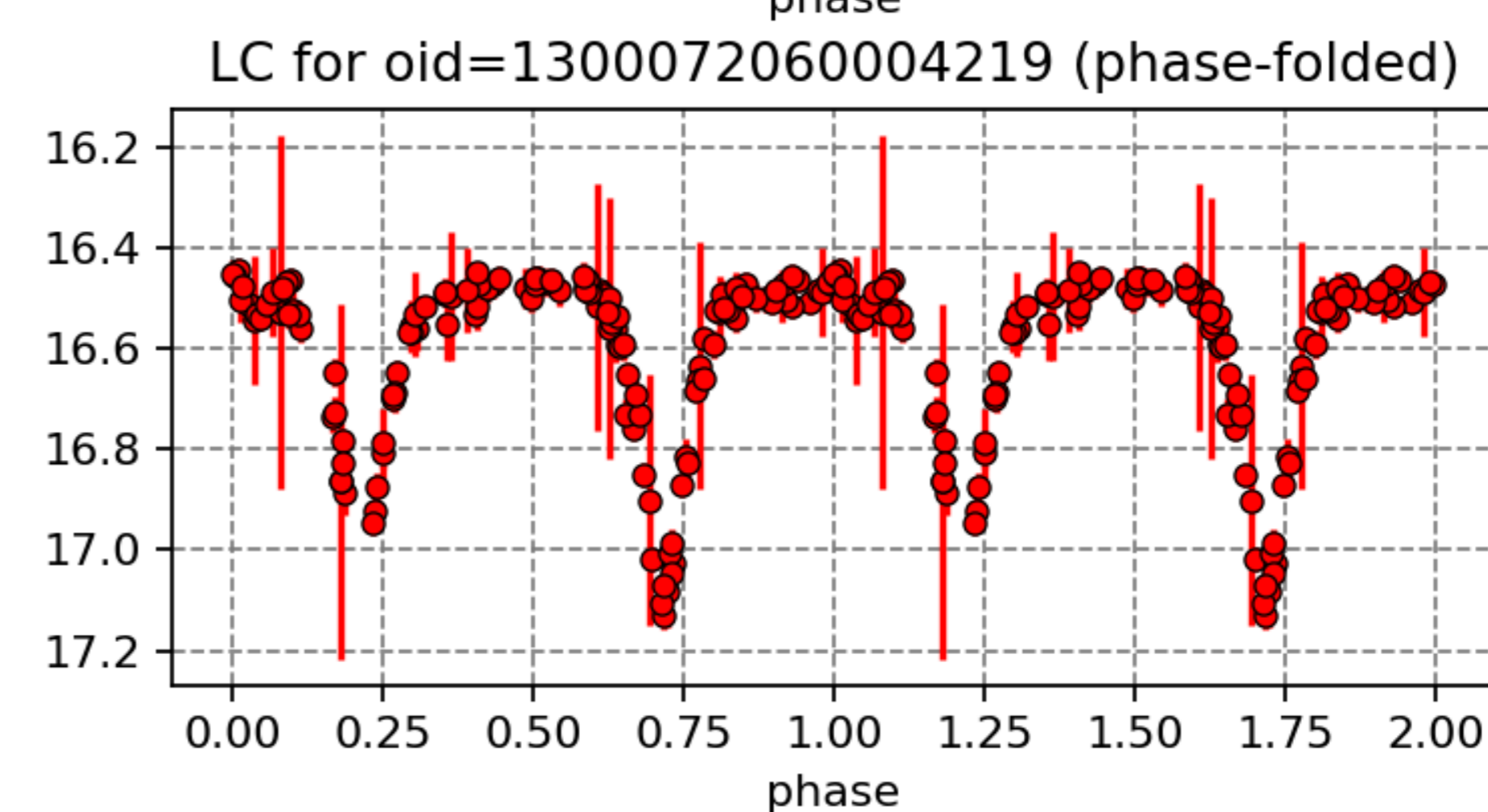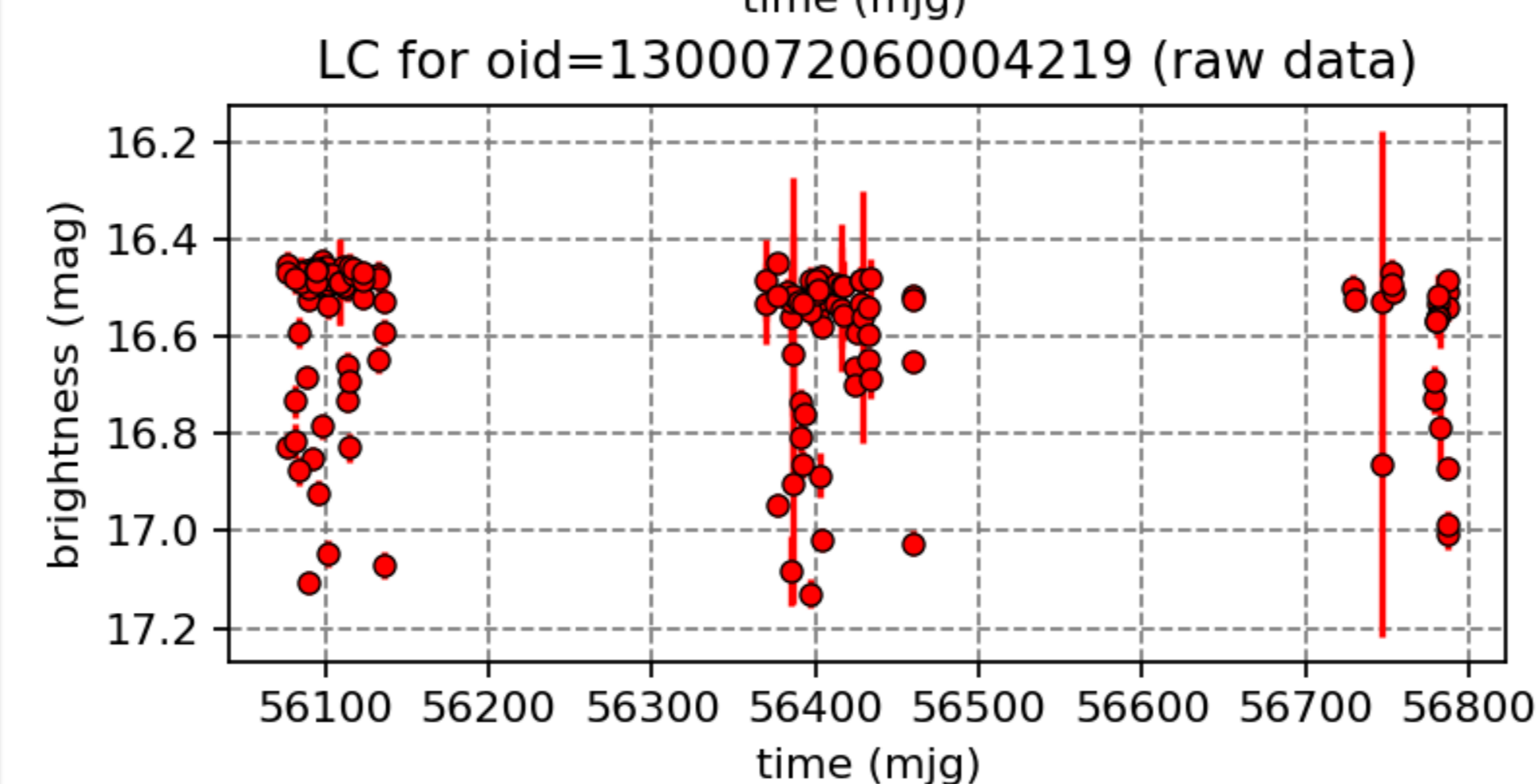

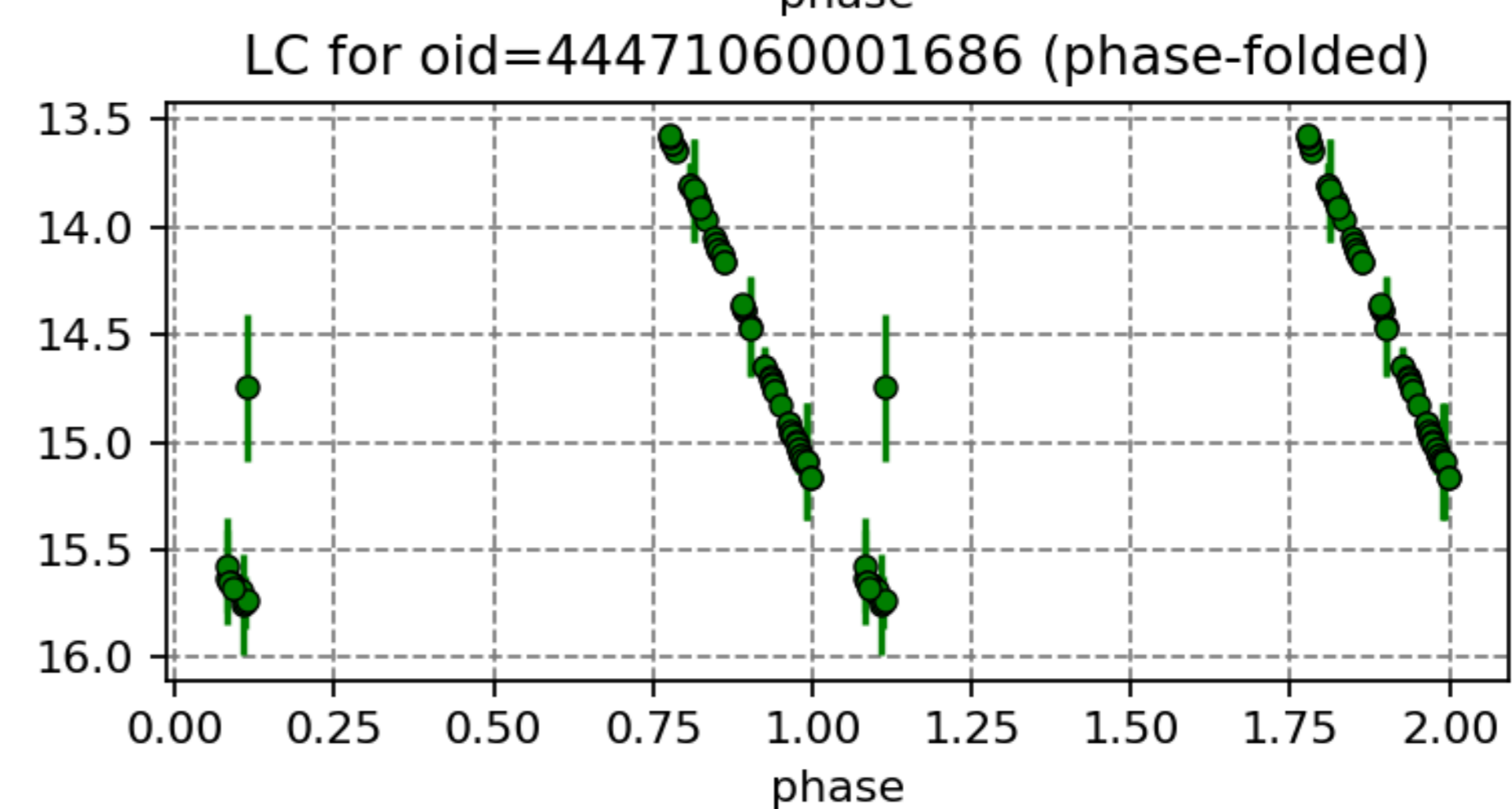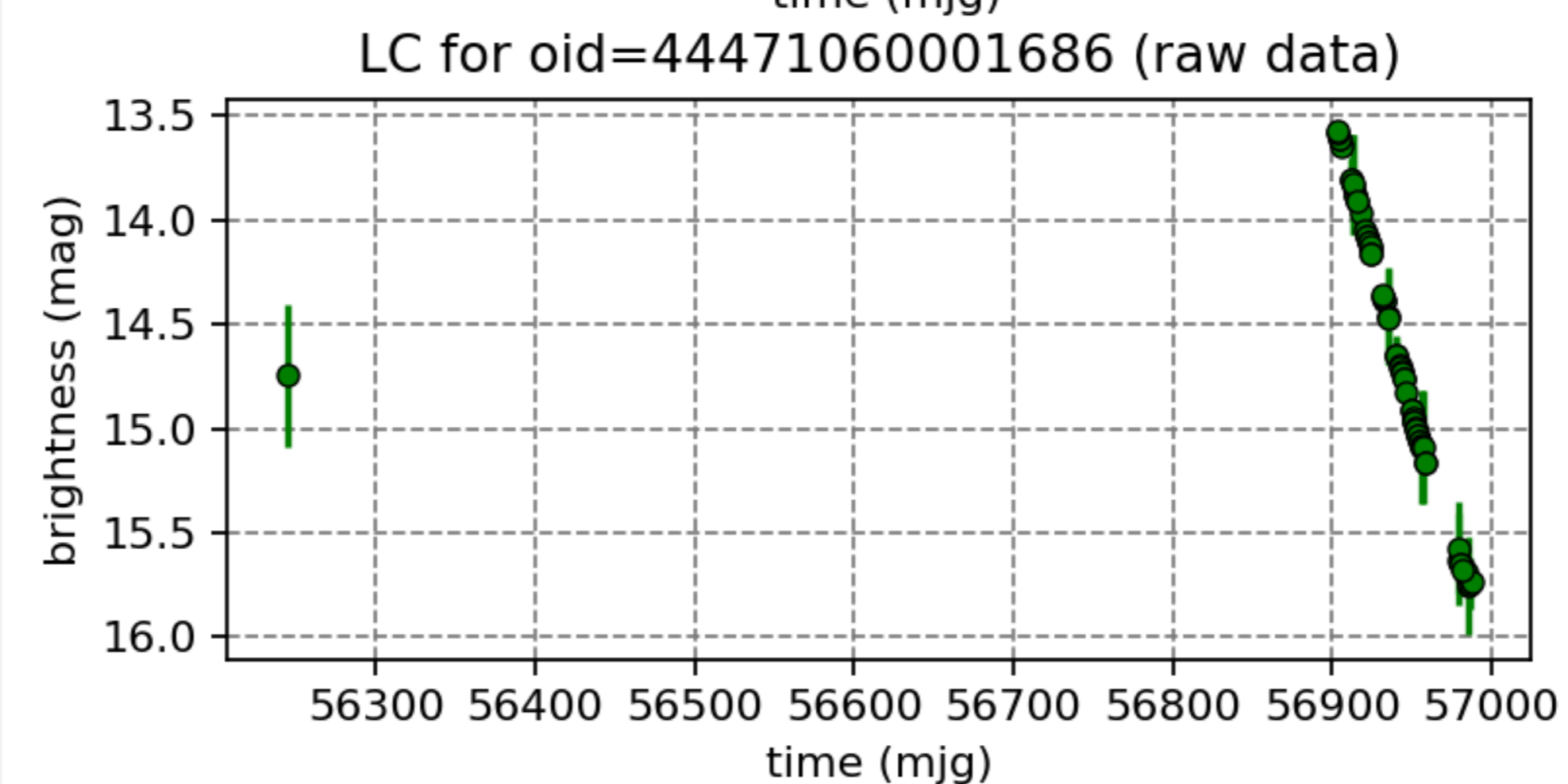Image credit: SLAC

Software Stack
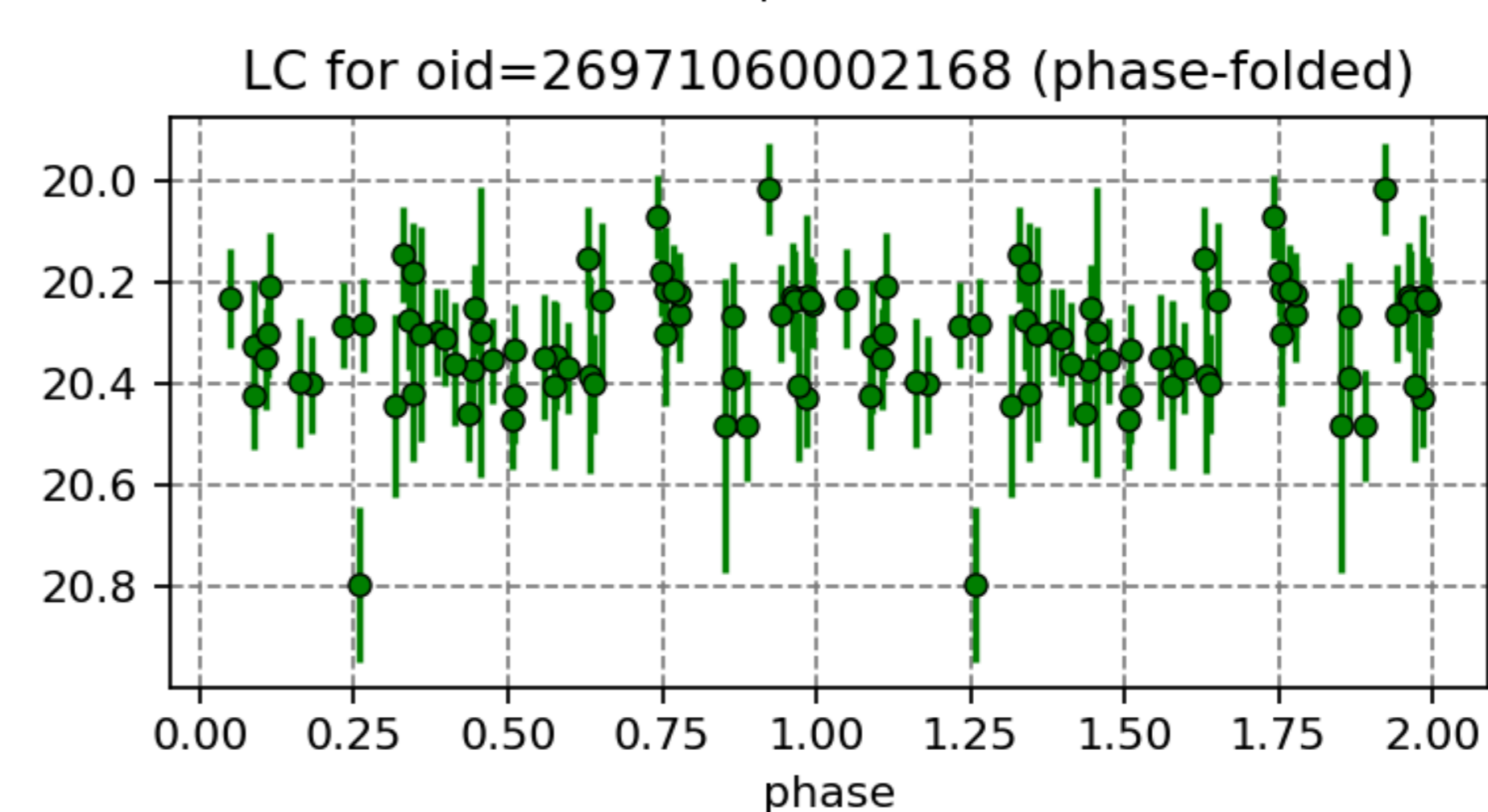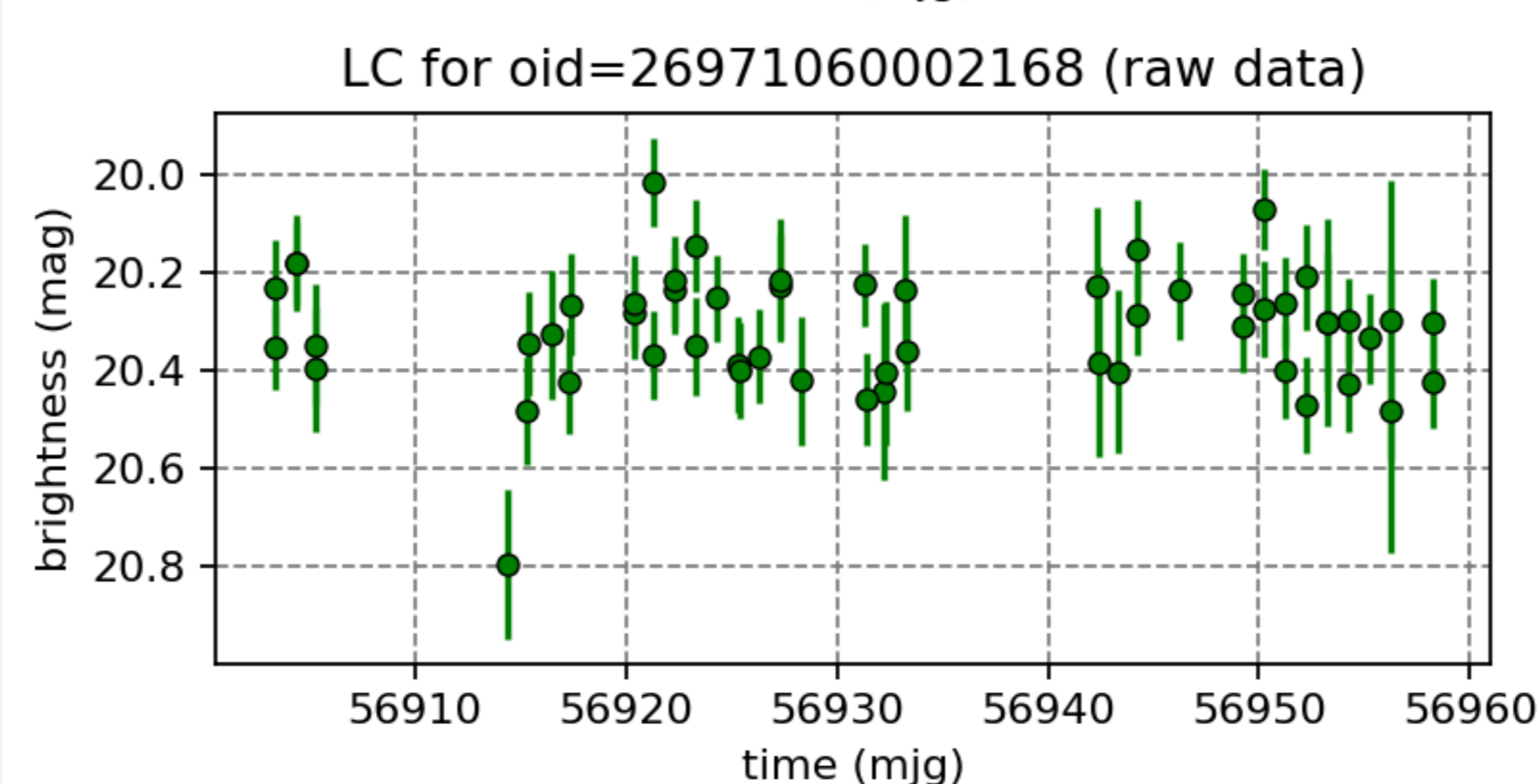

Zooniverse Light Curve (LC) Plots

RR Lyrae (type RRab) Light Curves from PTF data; period = 0.6633 d

Eclipsing Binary Light Curves from PTF data; period = 0.3422 d

Mira Variable Light Curves from PTF data; period = 247.65 d

Quasar (AGN) Light Curves from PTF data; Non-periodic