

SOLICITATION TITLE: Comparing EB Modeling Codes to Search for Systematics
SOLICITATION DEADLINE: Jan 31, 2020
SOLICITATION SPONSOR: Dr Kyle Conroy
SOLICITATION FUNDING: VURF/Department

PHOEBE is an eclipsing binary modeling code developed by several members of the department (K. Conroy, A Prsa, A Kochoska, among others). This code aims to be as robust as possible, even if at the cost of being computationally expensive. Many other codes exist, however, each making their own set of approximations and assumptions. The selected student can choose to either (1) study the assumptions and approximations of each code, choose a particular assumption, compare the synthetic models from several of these codes across the relevant parameter space, and determine if there is any systematic bias caused by the choice of modeling engine; or (2) make the assumption that PHOEBE is “correct” and determine which regions of parameter space it is safe (to some tolerance) to trust the outputs of any of the other available codes. The results from this study are increasingly important as large surveys of EBs are becoming both more precise and contain larger sample sizes.

SOLICITATION REQUIREMENTS:

The research position is open to all Villanova undergraduates that are majoring in astronomy or a closely related field. Experience with Python is suggested, but not required. Applicants need to provide:

- a current CV that highlights commitment to excellence in the applicant’s current field of study;
- a 3-page proposal that discusses the scientific background and proposed work timeline;
- a 1-page narrative on expected outcomes and procedures; and
- a 1-page personal statement that conveys the suitability and interest of the applicant.

To apply for this position, interested students need to submit their applications by the deadline in the form of a single pdf document. Only electronic submissions are accepted; email your applications to kyle.conroy@villanova.edu. Any applications received after the deadline will be returned without review.

SOLICITATION DOCUMENTS:

In order to prepare a strong proposal, the following sources might be useful:

- PHOEBE website: <http://phoebe-project.org>
- PHOEBE 2.0 release paper: Prsa+ 2016
- Documentation or publications describing other codes, including: jktebop (Southworth+ 2013), ellc (Maxted+ 2016), Wilson-Devinney (Wilson & Devinney 1971), photodynam (Carter+ 2011, Carter+ 2012)

In addition to these, applicants are encouraged to use their own sources of information.

SOLICITATION OUTCOME ANNOUNCEMENT:

The review of solicitation material will begin on Feb 1, 2020 and a short-list will be assembled by Feb 14, 2020. The highest-ranking candidate will be informed and offered a position. In the event that the highest-ranking candidate accepts the position, the solicitation will be closed. Otherwise the position will be offered to the next highest ranking applicant until the position is filled.