Qualifying Exam Cover Letter - Tom Wagg

Thank you for taking the time to read my submission for the Fall Qual. I'm very excited to hear your feedback and I hope that you find that it meets the criteria for reaching the oral stage. Below I've split the cover letter into the details that Matt asked me for:

Remaining work before submission

We intend to submit this work within the next month. Before then, the main remaining work that I would like to do is in the discussion, specifically section 4.2. I'm in the process of (a) making a new plot for this section to show how the digest2 score improves at identifying NEOs over the course of LSST (either to replace Figure 7 or possibly in addition to it) and (b) making some estimates of stringent cuts on ecliptic latitude that could produce a pure sample of NEOs even with the huge MBA background in the first year.

Contributions from others

Peter Yoachim used `rubin_sim` to create the simulated predicted schedules for LSST and I applied this to my new algorithm. Sam Cornwall used `opsim` to perform simulated observations of LSST which I used in analysing digest2's performance. Joachim Moeyens helped me to run his codes `thor` and `difi` for use in my work. All writing is my own with the exception of minor typo/grammar fixes from my mentoring committee.

Comments from mentoring committee

Restructuring: Mario suggested that I restructure the paper. Previously it was a simple Methods, results, discussion format but that meant I had to explain my new algorithm *before* giving a reason for requiring it. I've now restructured the paper into a Part I & II format as he suggested, where the first part handles the effect of LSST on the NEOCP using current submission criteria and the second part details some mitigation strategies we have created to fix things.

NEO Background: Combining a couple of comments here, I was asked to add more background information on NEOs that will be observed by LSST, and the probability of hazardous impacts. I've added details in the introduction (Section 1) to outline this and make it clearer exactly what I mean by NEOs.

digest2 algorithm details: Both Jess and Eric suggested that I add more details about the digest2 algorithm and how it is used. This should hopefully clarify the current system and help to highlight its shortcomings. I added several paragraphs to Section 2.2 to address this.

Expand digest2 improvement section: In section 4.1 I propose several improvements that could be made to the digest2 algorithm. A common comment across all of my committee members was that I should expand this section in detail. I have therefore extended this section and given specific parameters that could be used to better constrain the nature of a source (specifically in whether it is an NEO or an MBA).