

Jan 28, 2020

Dr. Steven Crawford
AAS Scientific Editor

Re: Pan-STARRS Photometric and Astrometric Calibration

Dear Dr. Crawford,

We are resubmitting our article "Pan-STARRS Photometric and Astrometric Calibration" after addressing suggestions raised by the referee. We thank the referee for detailed comments and suggestions. Below are our responses (in bold) to the referee's suggestions (plain text).

Sincerely,

Eugene Magnier
University of Hawaii at Manoa
Institute for Astronomy

Reviewer's Comments:

The paper "Pan-STARRS Photometric and Astrometric Calibration" by Magnier et al. describes the calibration of a major modern sky survey. The paper is well written and provides sufficient technical detail to not only for the reader to understand what was done, but also to inform future surveys. Given this legacy aspect, my only major comment is that it would be prudent to discuss the performance of Pan-STARRS calibration in comparison to other major optical surveys, such as SDSS, DES and HSC surveys. Such a discussion would illuminate all your advances and provide direction for future work. My other, much more minor comments are listed below.

We agree with this suggestion and have substantially extended the Conclusion section to put this article in the context of other recent and future surveys.

- Abstract: it would be good to provide quantitative summary of photometric and astrometric performance (such as values listed in fig. 4 caption)

We added this to the abstract.

- after eqs. 5 and 6: I was puzzled why there was no source color dependence in these equations; you may want to clarify that early

Clarification added to the end of section 3.3

- page 5: S in LSD, S stands for "Survey", not "Scale"

fixed

- page 8, left column, 1st paragraph: you may want to state that your fundamental assumption is that the chemical and thermodynamical state of the atmosphere is constant throughout a night

Clarification added

- page 8, left column, 3rd paragraph: what does word "reliability" mean in this context? It's certainly not standard statistical usage.

This paragraph was reworded to describe the reliability of the Schlafly et al results more clearly.

- page 8, left column, last paragraph: this result (20-35 mmag) is discrepant by a factor of ~3 compared to Schlafly et al. results; please comment and clarify

The Schlafly et al results do not constrain the absolute zero points, relying on a tie via SDSS. The Scolnic et al analysis determines the absolute zero points directly. This has been explained at the end of Section 5.1.

- page 9, right column, 2nd paragraph: this clipping procedure sounds like an ad hoc hocus pocus; can you provide at least some statistical justification (e.g. what is the distribution model you had in your mind)? perhaps even more ad hoc procedure is assigning weights of 10x their default; why 10 and not 5, or 50, or?

Text has been added to 5.3 (p. 10) to explain the outlier rejection process and rationale.

- similarly to the above comments; what statistical outlier model are eqs. 17 and 18 supposed to model/address?

Clarification has been added to the text in section 5.4.2 to explain the outliers.

- comment about proper motions after introducing eqs. 21-24 is not entirely correct because a lot of your observations are far from the galactic plane and thus are sensitive to the asymmetric drift effects for disk stars

This is a good point. We have updated the text in section 6.2 to address this concern.

- last paragraph in section 6.2: so how much improvement did you get from eqs. 21-24?

The improvement is noted now in section 6.2.