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**ApJS - Referee's report on AAS17746**

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Thu, Jun 6, 2019 at 6:25 PM

June 7, 2019

Dr. Eugene A. Magnier  
University of Hawaii at Manoa  
Institute for Astronomy  
[2680 Woodlawn Drive](#)  
Honolulu, HI 96822-1897

Title: Pan-STARRS Photometric and Astrometric Calibration

Dear Dr. Magnier,

We have received the referee's report on your above submission to The Astrophysical Journal Supplement Series, and it is appended below. As you will see, the referee thinks highly of your work and has only a few suggestions for changes.

When you resubmit the manuscript, please include a cover letter in which you outline in detail the specific changes you have made in response to each of the referee's comments.

Click the link below to upload your revised manuscript;

<https://aes.msubmit.net/cgi-bin/main.plex?el=A5KO2BVM6A5Hlp7J4A9ftdqkOCn782zob4d43hqFadAZ>

Alternatively, you may also log into your account at the EJ Press web site, <http://apj.msubmit.net>. Please use your user's login name: emagnier. You can then ask for a new password via the Unknown/Forgotten Password link if you have forgotten your password.

Reviewers find it helpful if the changes in the text of the manuscript are easily distinguishable from the rest of the text. Therefore we ask you to print changes in bold face. The highlighting can be removed easily after the review.

The AAS Journals have adopted a new policy that manuscript files become inactive, and are considered to have been withdrawn, six months after the most recent referee's report goes to the authors, provided a revised version has not been received by that time.

If you have any questions, feel free to contact me.

Sincerely,

Dr. Steven Crawford  
AAS Scientific Editor  
Space Telescope Science Institute

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Referee Report

## 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.

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

- 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

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

- 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

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

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

- 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?

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

- 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

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