

Reply to referees

Manuscript "Magnetosheath plasma flow model around Mercury" by Schmid et al.

Again we would like to thank the both reviewers for taking time to review this manuscript and for the throughout very helpful suggestion to improve the quality. We give our reply to each of the review comments in the following in red and changes in the manuscript are marked in blue.

Editor

> I have a comment on the used symbolism. When the authors write \cos^{-1} , I think that they > may want to refer to arccos. This is not correct since \cos^{-1} means $1/\cos$. > could you please check and correct this

True. We used the notation of an inverse function: $\cos^{-1}(x)$ and not the reciprocal trigonometry function $(\cos(x))^{-1}$.

To avoid any confusion we follow the Editor's suggestion and changed the notation accordingly to arccos, arcsin and arctan throughout the manuscript.

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Reviewer 1

> The authors produced a new version of the paper taking into account comments and > remarks from both referees. In particular the second referee had some valuable criticisms > on the physics and motivation of the model that have been adequately answered and > improved the quality of the paper. The present paper is of publishable quality.

[1.1]

> I have one small comment on Equation 16 which holds 1 'cos' and 3 'sin' which looks a bit > awkward for a rotation matrix; but I did not check precisely and this may be ok.

True. Equation 16 had two typos, which have both been corrected. Equation 16 now reads (Line 175 on page 9)

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} \cos \theta_a & -\sin \theta_a \\ \sin \theta_a & \cos \theta_a \end{pmatrix} \begin{pmatrix} x \\ \rho \end{pmatrix}$$

[1.2]

> I note that the DOI for the 2 papers by Guicking are missing the 10.5194 prefix. These > references in the text are not in italic. Like Aizawa et al. which is 2021 not 2011.

Done. The citations have been double-checked and corrected. Line 275 and 285-291, page 13.

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Reviewer 2

> The authors have carefully considered all comments, remarks and suggestions made by
> the referee.

> The work is ready for publishing after correction of these three minor issues:

[2.1]

> 1) [Eq. 6, line 90] "nabla dot (nU)," -> "nabla dot (nU) = 0,"

Done. Equation 6 has been changed accordingly. Line 90, page 5

[2.2]

> 2) [Eq. 16, line 175]

>x cos(theta_a) -> cos(theta_a)

> x sin(theta_a) -> sin(theta_a)

> rho cos(theta_a) -> cos(theta_a)

> rho sin(theta_a) -> sin(theta_a)

Done. See comment [1.1]

[2.3]

> 3) [line 223] "... of the particle flux in the magnethsheath would ..." -> "... of the particle flux
> in the magnetosheath would ..."

Done. Typo has been corrected. Line 222, page 11.