

# Response to Reviewer #2 Comments

We thank Prof. Marina Stepanova for the positive assessment of our manuscript and for recommending its publication after revisions. We appreciate the constructive feedback and have addressed each point as follows:

## Specific Comments

### 1. Introduction too brief; need better articulation of significance and prior work

**Reviewer comment:** *The introduction is too brief... it is necessary to better articulate the significance... Specifically, what prior work has been done in this specific topic, what gap does this study aim to address?*

**Response:** We agree and have revised the Introduction to provide a clearer context for the study. Specifically:

- We now summarize prior works analyzing transport processes in Maxwellian plasmas and the few attempts made for Kappa-distributed plasmas.
- We highlight that previous studies largely focused on simplified models.
- We explicitly state the gaps and the aim of the study more clearly.

### 2. Sections 2 and 3 are long; suggest moving equations to Appendix

**Reviewer comment:** *Sections 2 and 3... suggest shortening by moving a significant portion of the equations to the Appendix.*

**Response:** We have substantially shortened Sections 2 and 3 by transferring several detailed derivations. The main text now focuses on the physical interpretation and novel aspects of our formulation.

### 3. Expand Conclusions to emphasize new insights and applications

**Reviewer comment:** *I would also suggest expanding the conclusions section to emphasize what new insights we have gained...*

**Response:** We have expanded the Conclusions section to:

- Highlight the main findings.

- Discuss a number of limitations and how we can address them in future work.
- Discuss the potential applications of these results in space plasma modeling.

## Technical Corrections

### 4. Add labels near colorbars (Figures 1–3)

**Response:** We have revised Figures 1–3 to include clear labels near the colorbars. Temperature and kappa values are now indicated within the plots to improve clarity.

### 5. Differentiate overlapping lines in Figure 4 (kappa = 100, 1000 vs Maxwellian)

**Response:** We have modified Figure 4 to use dotted and dash-dotted line styles for  $\kappa = 100$  and  $\kappa = 1000$ , respectively. This makes it easier to visually distinguish these cases from the Maxwellian result.