

Interactive comment on “Dust observations with antenna measurements and its prospects for observations with Parker Solar Probe and Solar Orbiter” by Ingrid Mann et al.

Ingrid Mann et al.

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We thank the referee for the constructive comments. All comments were taken into account and the manuscript was modified accordingly. A response to each comment is given below in bold letters.

Review Comment on manuscript angeo-2019-94 entitled ‘Dust observations with antenna measurements and its prospects for observations with Parker Solar Probe and Solar Orbiter’ by Mann et al., This paper surveys the spacecraft charging observations as the dust impact detector in the past and future projects. Some minor collections and additional information for the readers will be needed before publication.

L50. 'The majority of fragments smaller than micrometers are pushed outward by radiation pressure and electromagnetic forces.' Is this the theoretical expectation or is there any observed pieces of evidence? -This is based on theoretical expectations and to some extent confirmed by observations. We have included a reference describing the theory and observations.

L 87. Fig (Fig. laboratory) -> Figure 2? Also, some text styles for figures are not set in the same format. Please check. -We corrected the reference to the figure and modified Fig.2.

Chapter 5 (previous observations) This chapter summarizes the dust detection by the electric field antenna onboard different spacecraft and environment. While the author well surveys all the past dust observations, it would be helpful for future readers if the results were summarized according to the favorable electric field measurement for the dust detection of the different sizes. -We modified the structure of the chapter 5 and introduced a new order of subchapters in order to have a better flow of the description.

L218. 'STEREO is . . . orbit the Sun at around 1 AU' The unit of the orbital distances used in this chapter is sometimes AU and 'Re' for another time. I would suggest using only AU for easier comparison. -AU describes a distance from the Sun and Re a distance from the Earth. We used AU for spacecraft in interplanetary space (STEREO, Cassini cruise) and Earth radii (Re) for Earth-orbiting spacecraft (Cluster) and Wind located at L1 point. Difference between AU and Re is more than three orders of magnitude and we therefore think that using these two units in different sections of the text is appropriate and helps the reader to quickly understand the size scales.

L208. 'Panel (E) shows a case of even higher positive bias. All electrons are re-collected in this case. The signal has no electron (blue) part and it has no "pre-spikes" in this case.' The color of the Figure 4E must be mistaken (blue->red?) -We have changed the panel E in Figure 4.

L276. 'Once these effects were taken into consideration, the estimated near-Mars

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micron dust flux observed by MAVEN was found to be consistent with the interplanetary dust flux expected at Mars.' Please cite the reference that shows this fact. -We added a reference: indeed the experiment analysis indeed supports that the measured impacts are from interplanetary dust.

L315. 'Figure 9 compares . . .' Please make the figure numbers in order in the text. Figure 9 comes before Figures 7 and 8. -We checked the order of figures and modified it according to sequence given in the text.

L480. 'Figure 13 shows estimated signals for impacts of 0.1-micrometer particles with speeds of 100 km/s for spacecraft at different distances from the Sun.' Please cite the reference for figures 13 and 14. -These figures are originally created for this manuscript. We have modified the text so that this fact is obvious for the readers.

L484. 'With the same estimate, we find that for the particle size of 0.01 micrometer and speed 200 km/s the pulses are 485 about a factor of 100 to 1000 smaller.' Is this signal difference due to the different sizes of dust? Does the signal become bigger for the higher speed with the same dust size? It would be helpful to put the result of this simulation as the bottom panel of Figure 13. -We have modified the sentence. We describe general dependence on mass and velocity of impacting grains instead of one particular case.

L495. 'The Mercury Dust Monitor (MDM, Nogami et al. 2010) will in near future study the dust environment near Mercury at 0.31 to 0.47 AU from the Sun.' Bepi-Colombo/MMO has also electric field antennas (PWI). -We included information about the electric field antenna (PWI) into the text.

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