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Interactive comment on "Total Reflection of the Strahl within the Foot of the Earth's Bow Shock" *by* Christopher A. Gurgiolo et al.

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This comment summarise a discussion of this manuscript by the Space Plasma Physics Group at the Mullard Space Science Lab, UCL.

This paper is an interesting study on the reflection of the strahl electrons with valuable conclusions as the abstract addresses: 1. the strahl is fully reflected at the bow shock; 2. the reflection occurs in the foot of the shock.

A major thing we suggest is that this paper should be more focused on the main idea of this study. The authors could reorganize this manuscript and make it more concise for the reader. For example, in the observation section clarify which result support which conclusion point by point and make the logic flow more naturally. Perhaps moving the

observations supporting the second finding from the discussions section to the observations section could also make this main idea of this paper more focused. Another two conclusions: 3. how to determine the position of the spacecraft and 4. the reflection is specular, should also be clarified about their evidence.

The following are some minor suggestions.

In the solar wind, strahl electrons are occasionally bi-directional. A statement on this and whether it might affect these results would be helpful.

It would be helpful for the readers if the authors briefly summarise the methods from Shen et al. (2007) and Gurgiolo et al. (2005) for the shock normal determination in subsection 4.2.

In section 4.3, the assumption that reflected electrons are associated with the strahl itself uses the result of this paper. We suggest the authors present this argument more logically.

There are several subjective choices (energy ranges, reflection positions). We suggest that the authors discuss the effects of this subjectivity in the discussion section.

The authors introduce in too much detail some topics, such as: ion reflection, gyrophase bunching, foreshock waves, etc. We suggest the introduction to be more focused.

In data section, the introduction for PEACE and FGM could be more balanced (less for PEACE and more for FGM). Magnetic field data is also important for your results to come out.

Subsections of section 4 could likely be removed, such as 4.5 and 4.6.

The Figure 5 caption is not very clear, nor its description in the text. In figure 2 the title says full, strahl and return density, but the plot is only return density. In several figures, there are unnecessary text, such as figure 3,7,11, etc.

Overall, the work is interesting. We hope our feedback is helpful in the development of this paper.

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