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Interactive comment on "Crescent-shaped electron velocity distribution functions formed at the edges of plasma jets interacting with a tangential discontinuity" *by* Gabriel Voitcu and Marius Echim

Anonymous Referee #2

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This paper desctibes PIC-simulations of a magnetosheath jet (i.e. a localized increase in dynamic pressure caused by increases of density, velocity or a combination of both), crossing a northward IMF, dayside magnetopause (modelled as a tangential discontinuity without shear). The authors present a case where the jet is not penetrating the magnetopause, and in particular present detailed electron distribution functions from different parts of the jet at different stages of its interaction with the magnetopause.

The paper is well written with clear figures and results. The code and methodology builds on earlier studies and appears to be well tested. The results are clear and

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Discussion paper

interesting. In my opinion, the paper is almost ready for publications. I only have a few minor issues, listed below:

Minor comments:

1) What is the relevance of the number of the dielectric constant given on page 5, line 13? It is not commented further in the paper.

2) The authors note themselves that crescent-shaped electron distributions are also found in connection with X-lines and reconnection regions at the dayside magnetopause. It would be helpful if the authors discussed in more detail similarities and differences between those distributions and the ones found in this paper. Is it possible to differentiate by the two cases by just inspecting the distribution functions?

3) I think that the authors should discuss the relevance of their results a little bit more. They mention that the distribution functions can be used to estimate the geometry of jets, but there should be further points to discuss. For example, I assume that the resulting distribution functions are unstable to wave generation. What was could be expected to be excited? And how would moment calculations, which assume Maxwellian distribution, be affected?

4) No ion distributions are shown in this paper. The authors could at least comment on if any effects of the interaction are shown in those.

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