Supplementary material for

“Hybrid-Vlasov simulation of soft X-ray emissions at the Earth's dayside magnetospheric boundaries”

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The Supplementary Material consists of one figure S1 and three movies S1–S3, whose descriptions are given below.

Supplementary Figure S1

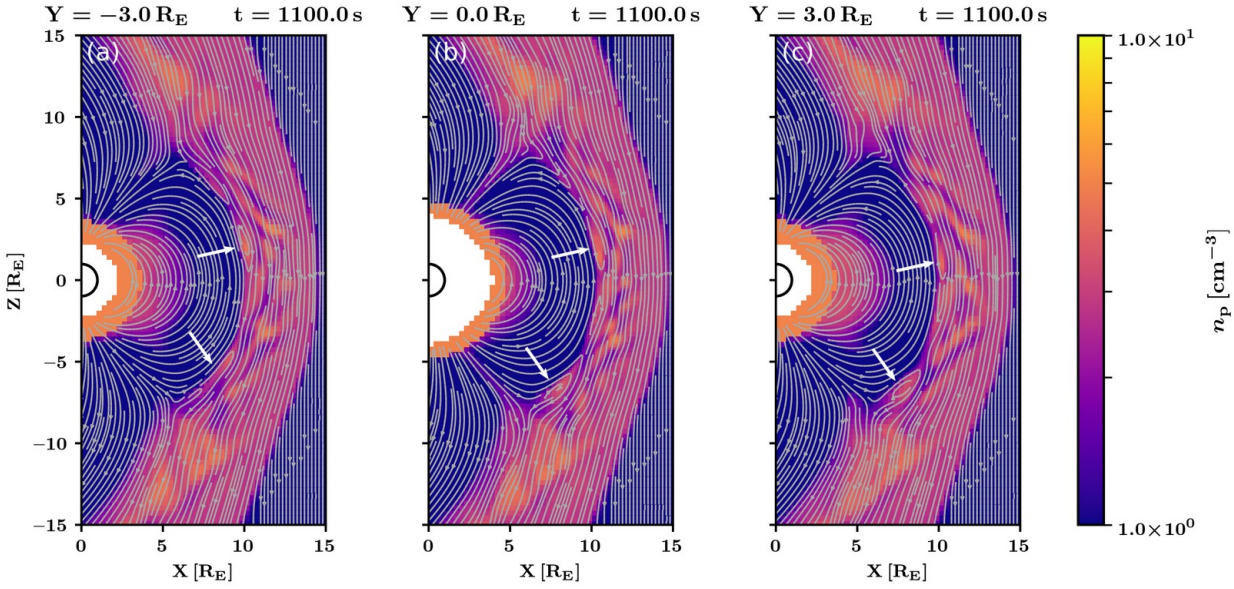

Figure S1 – Proton density at t = 1100 s in three planes: (a) Y = –3 R_E, (b) Y = 0, and (c) Y = 3 R_E. The grey streamlines denote the in-plane magnetic field. White arrows indicate FTEs, which exhibit proton density enhancements in their core and show as magnetic islands. One can see that two FTEs are present and extend over at least 6 Earth radii along the Y direction.

Captions for Movies S1–S3

Movie S1. Animation of Fig. 2 from t = 800 to t = 1506 s. (a) Proton number density, (b) proton bulk velocity, and (c) local soft X-ray emissivity in the $Y = 0$ plane. (d) Instantaneous soft X-ray image with 1 s integration time from a virtual spacecraft placed at (0, –30 R_E, 0). The red trapezoid in panel (c) indicates the intersection of the instrument's field of view shown in panel (d) with the $Y = 0$ plane.

Movie S2. Animation of Fig. 3 from t = 800 to t = 1506 s. (a) Proton number density, (b) proton bulk velocity, and (c) local soft X-ray emissivity in the $Z = 0$ plane. (d) Instantaneous soft X-ray image with 1 s integration time from a virtual spacecraft placed at (0, 0, 30 R_E). The red trapezoid in panel (c) indicates the intersection of the instrument's field of view shown in panel (d) with the $Z = 0$ plane.

Movie S3. Proton number density in the $Y = 0$ plane from t = 800 to t = 1506 s. Grey lines indicate magnetic field lines. Flux transfer events can be identified as regions of increased proton density within magnetic islands and propagating toward higher latitudes along the dayside magnetopause. Mirror-mode waves can be seen as Earthward-propagating structures with oblique orientation in the magnetosheath.