Main auroral emission at Jupiter

Main emission
→ magnetosphere-ionosphere coupling current system associated with the breakdown of corotation → ionospheric footprint of the upward field aligned currents (FAC, red dashed lines), carried by downward moving electrons

Local time variations of the main emission at Jupiter

Local time variation of the intensity of the main emission

Brightness profile
→ discontinuity 08:00 – 12:00 LT → localised peak 11:00 – 14:00 LT

Comparison with MHD simulation (Chané et al., 2013).
→ same trend in variation of intensity 
→ discontinuity caused by a thermal pressure decrease around 09:00 LT due to the interaction between rotating plasma and the magnetopause.
→ localised peak is not obvious in the simulation

Local time variation of the mapped location of the main emission: indication of the corotation breakdown location

Statistical location of the main emission on the equatorial plane (magnetic field model of Vogt et al., 2011):
→ closer in dawn-noon than noon-dusk.

Galileo measurements
→ downward FAC in the prenoon and early noon sector (Khurana, 2001) where the equatorial source of the discontinuity is located

Local time variation of the width of the main emission

The width (FWHM) of the main emission varies slightly in local time → due to asymmetry in the component of the magnetic field normal to the current sheet.

Conclusion

Main emission shows local time variations of:
• brightness → discontinuity associated with downward FAC due to a thermal pressure decrease → localised peak so far unexplained
• mapped location of the main emission on the equatorial plane → indication of the corotation breakdown location → closer in the dawn-to-noon quadrant than in the noon-to-dusk
• width → asymmetry in the component of the magnetic field normal to the current sheet