

Jovian auroral radio source occultation modelling and application to the JUICE science mission planning

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Low frequency radio emissions @ Jupiter

Galilean Moon occultations observed by Galileo/PWS

Calibrated Radio Spectrograms by Cassini/RPWS/HFR (top) and Galileo/PWS (bottom)

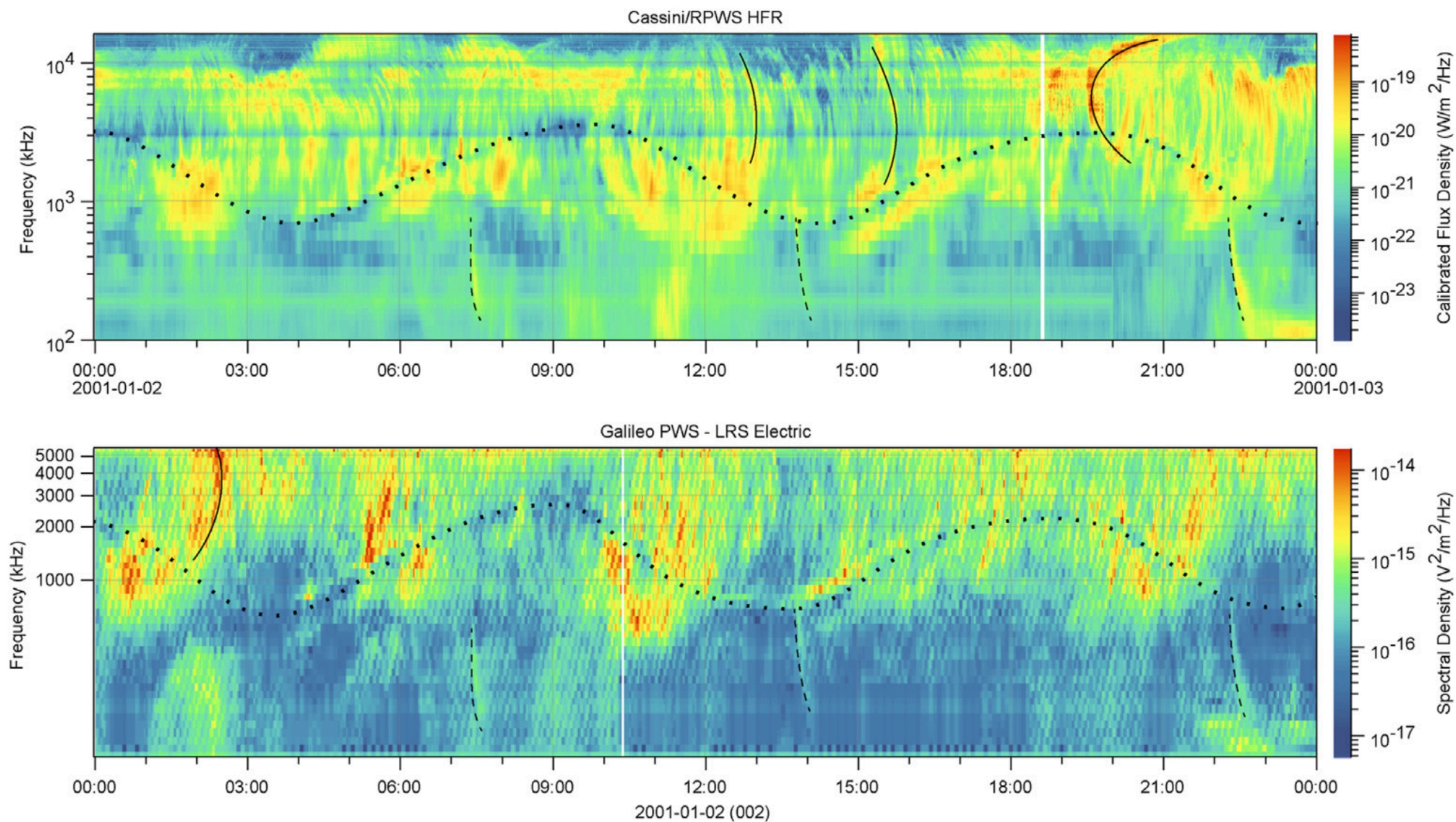


Fig. 1. Calibrated Cassini/RPWS/HFR (Zarka et al., 2004; Cecconi and Zarka, 2019) (top) and GLL/PWS (see Section 2.1) (bottom) radio electric power spectral densities during 24 h close to the Cassini flyby of Jupiter. Significant features have been highlighted: a few radio emission “arcs” are traced in plain line; Type III Solar radio bursts are traced in dashed line; and the attenuation lanes are traced in dotted line.

Occultation of Jovian Radio Signal by Galilean moons (Galileo/PWS)

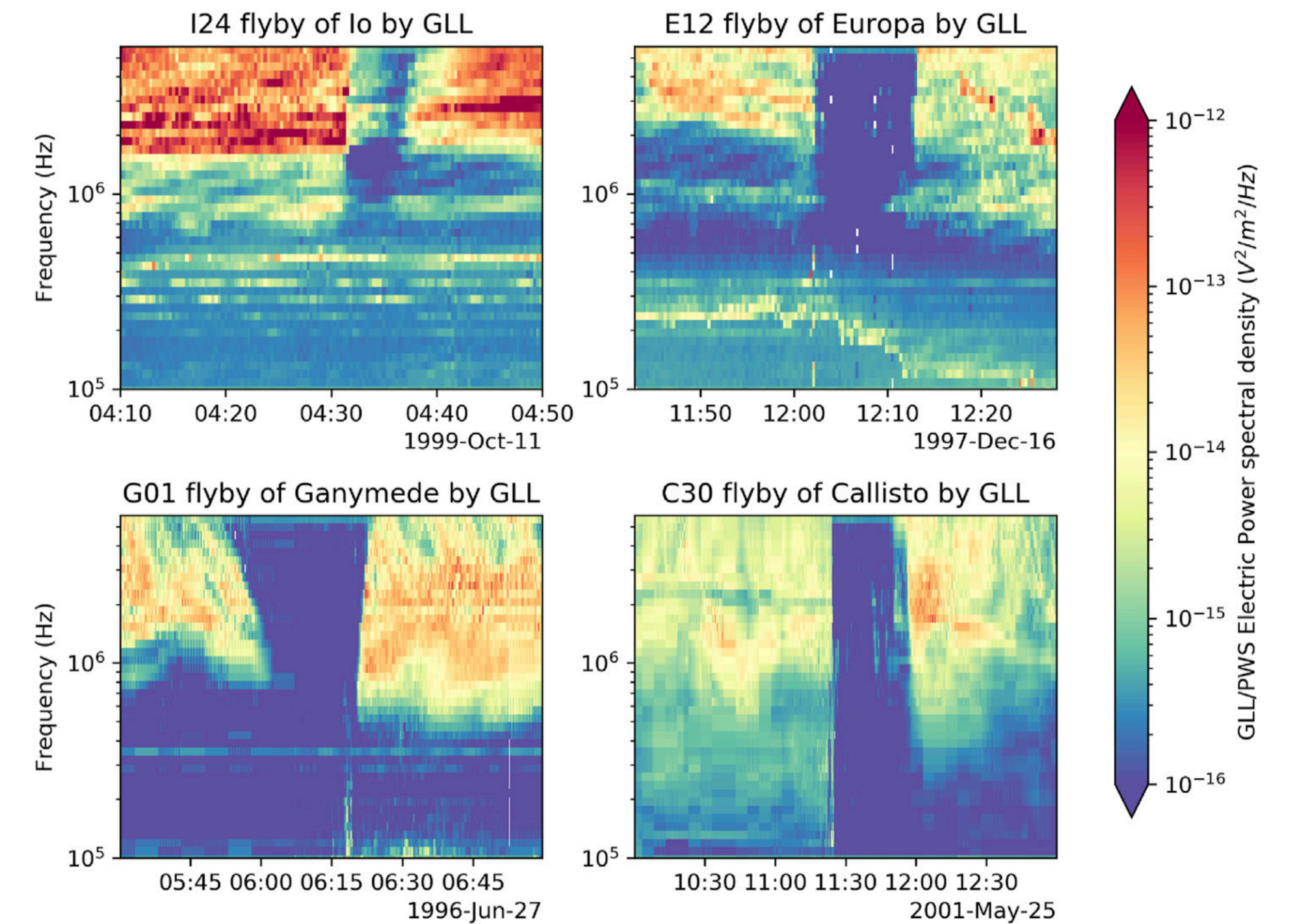
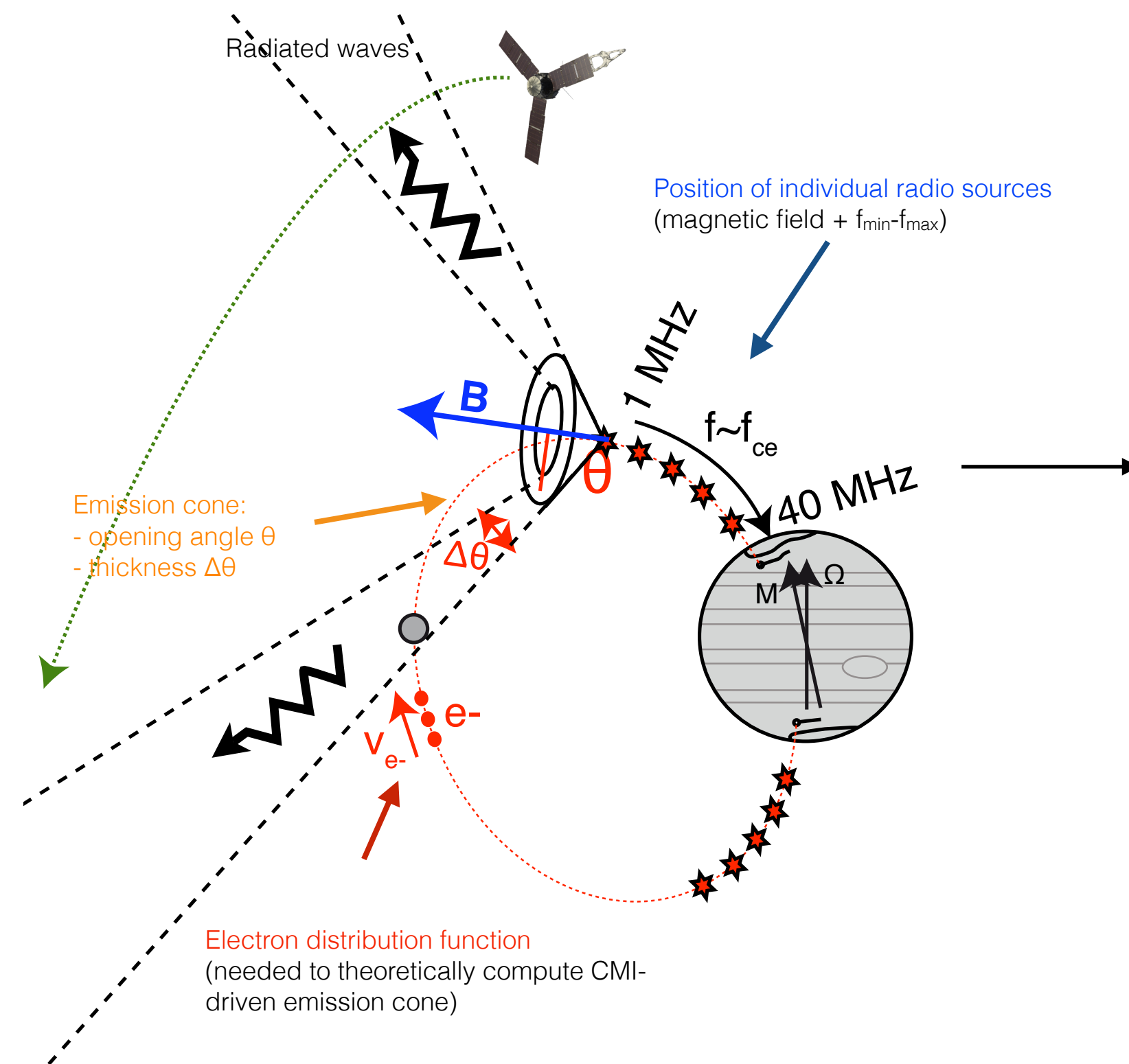


Fig. 2. Jovian radio emission occultations by Io (upper left), Europa (upper right), Ganymede (lower left) and Callisto (lower right), as seen by GLL/PWS. The figures are showing radio electric power spectral densities in $V^2/m^2/Hz$.

Low frequency radio emissions modelling

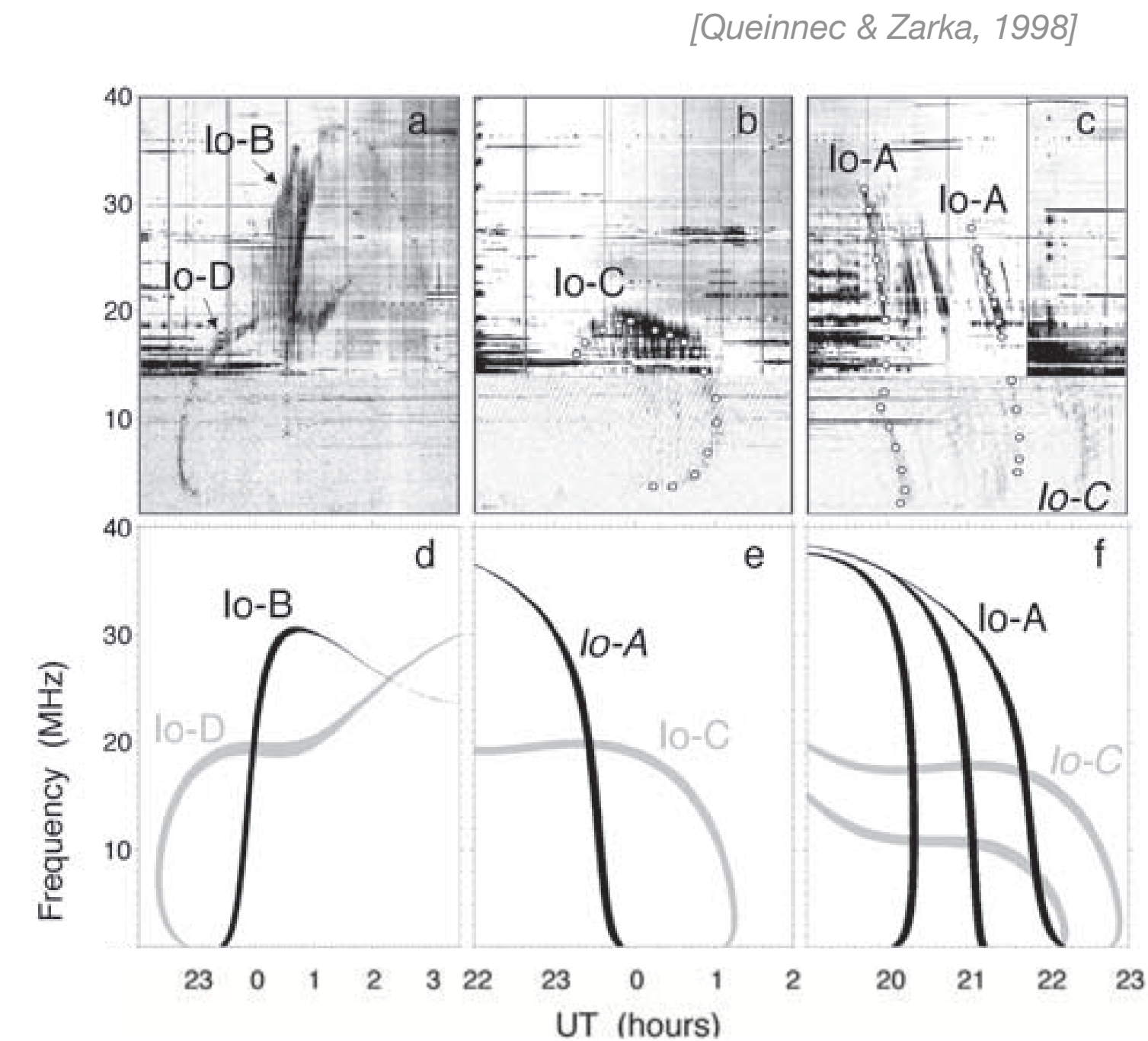
ExPRES (Exoplanetary and Planetary Radio Emission Simulator)



Principle

- Identify visible radio sources for a given observer
- Build associated dynamic spectra

[Louis et al., 2019, A&A]



[Hess et al., 2008]

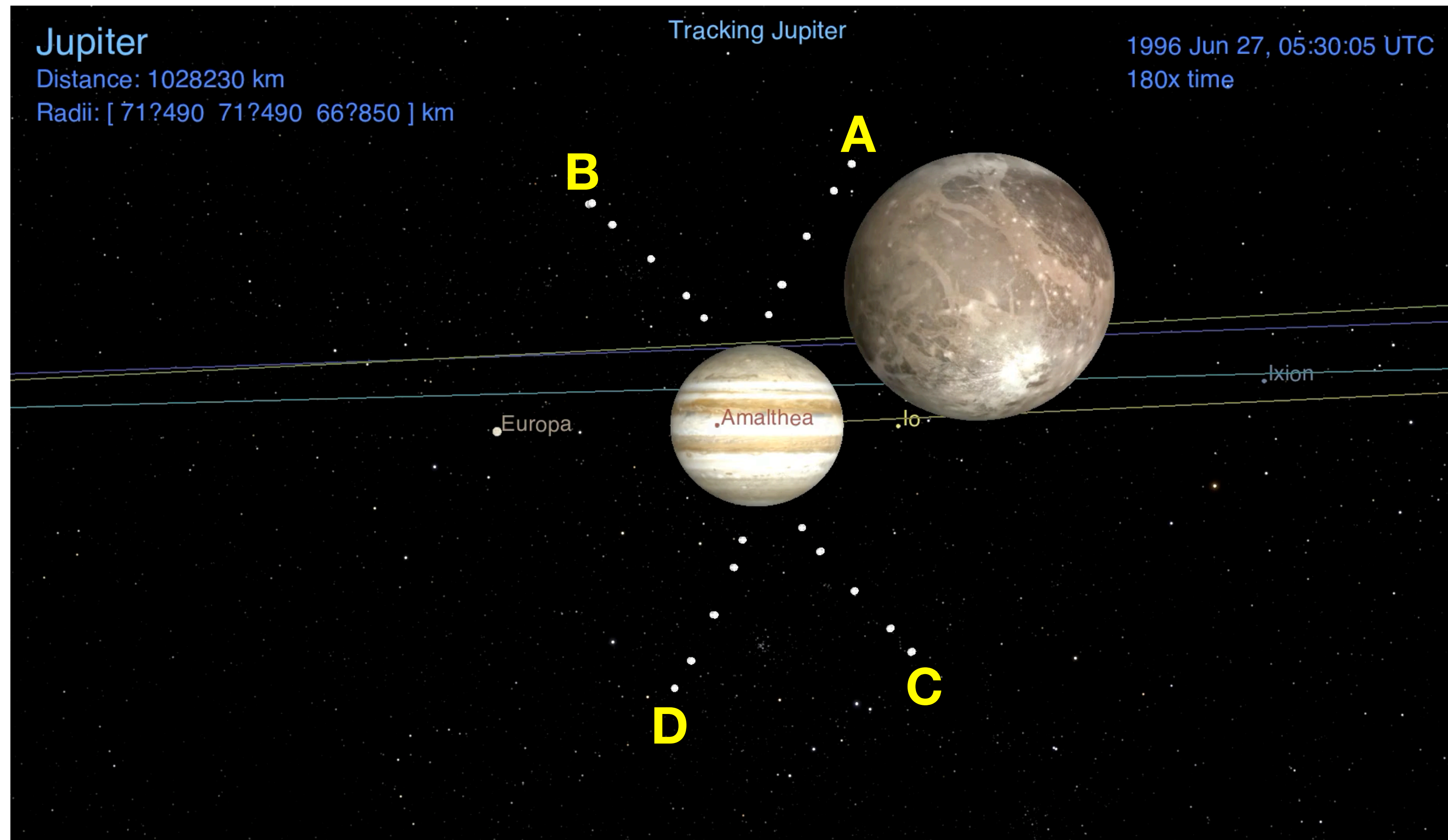
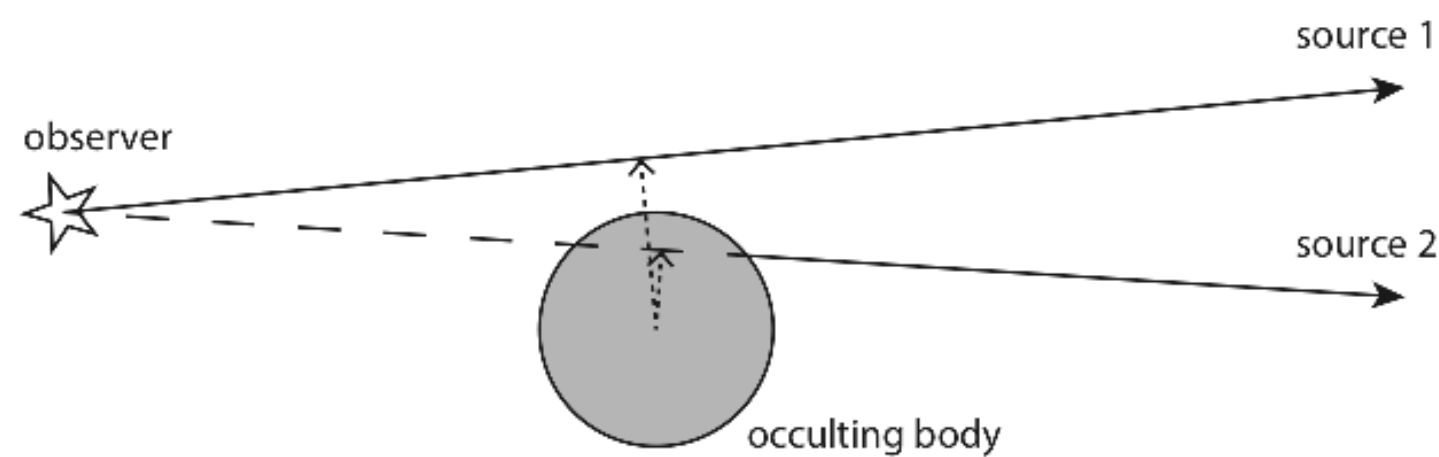
Physical assumptions

- CMI ($f=f_{ce}$)
- Straight line wave propagation

Modelling of occultations

ExPRES + WebGeoCalc + Cosmographia

- Modelled Radio sources:
 - auroral @ all longitudes
 - Io-controlled
- CMI beam pattern:
 - 4 groups of sources
- Direct Occultation



Visibility of Jovian Radio Sources (G01)

