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# Solar radio burst source locations in the inner heliosphere

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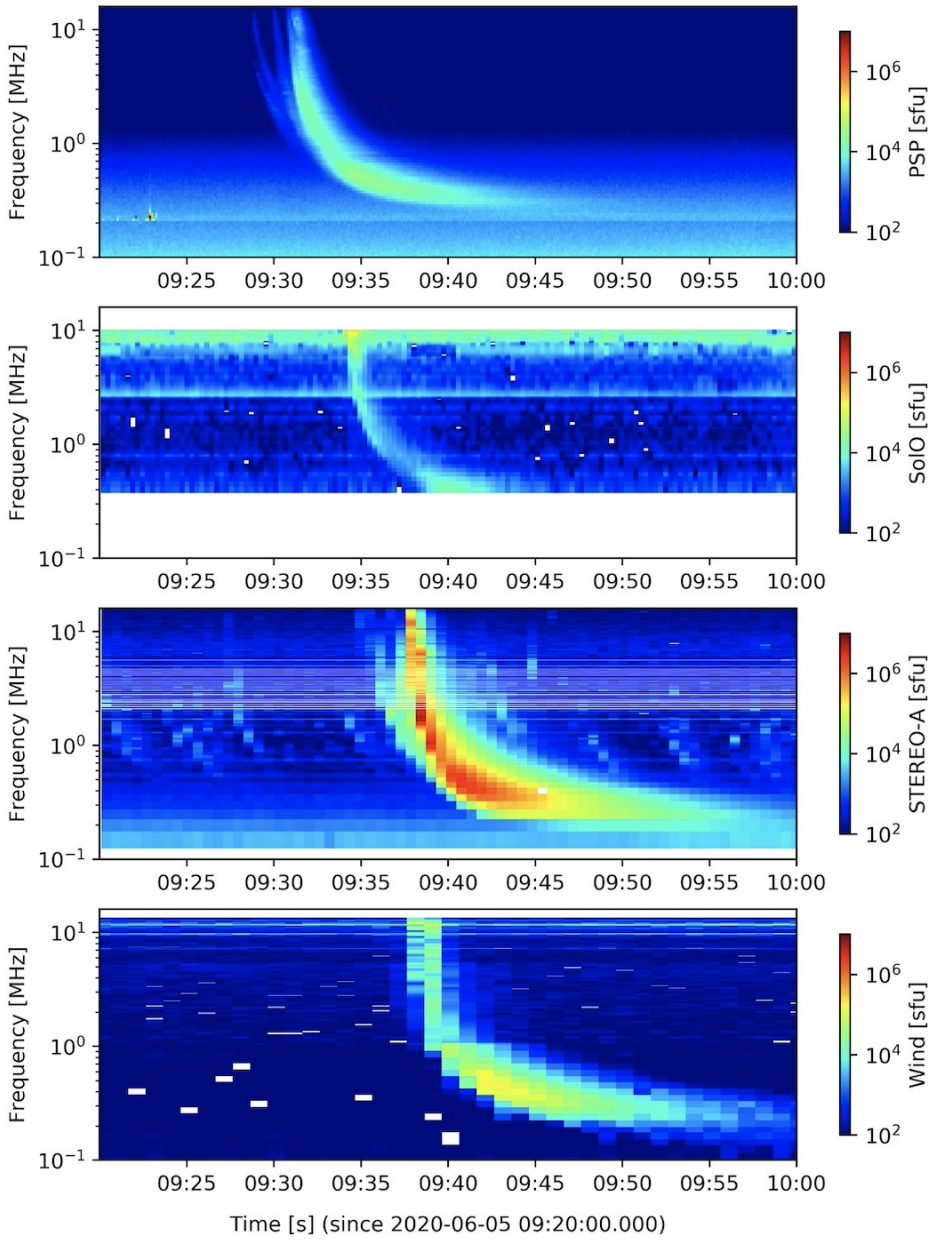
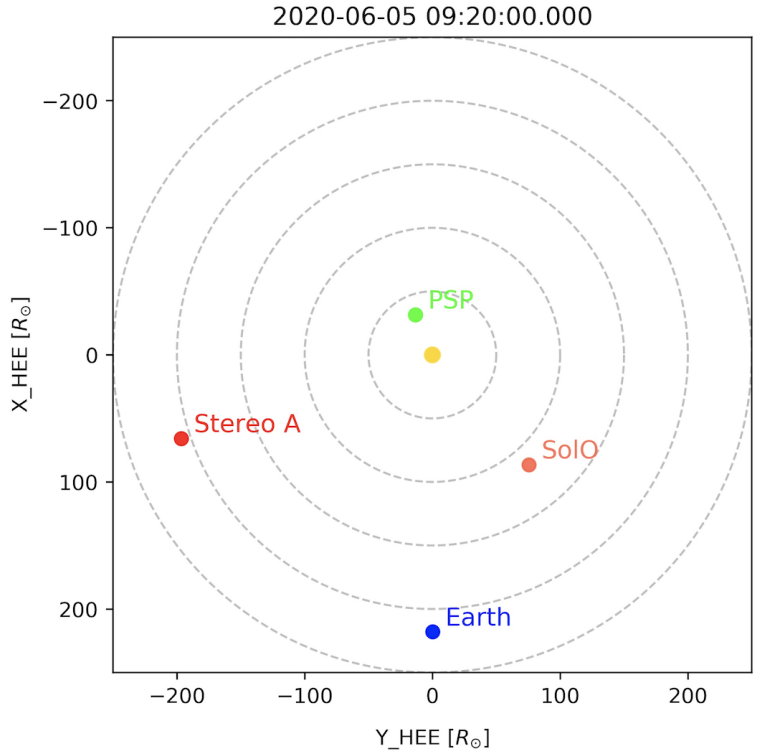
# 4 s/c observations of type III solar radio burst

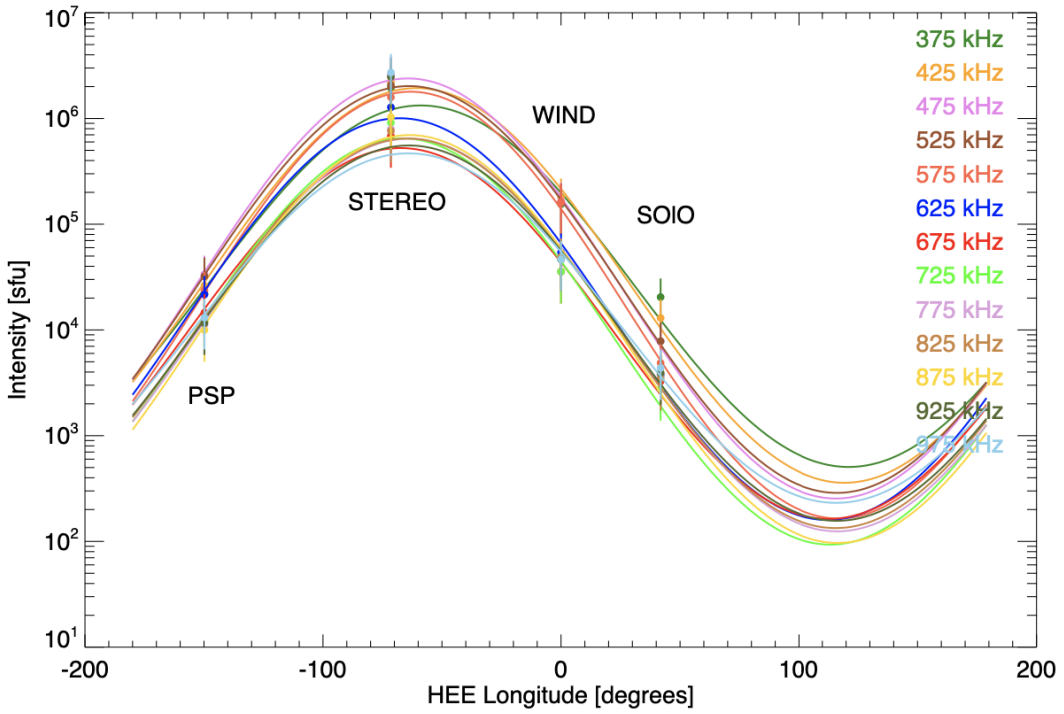


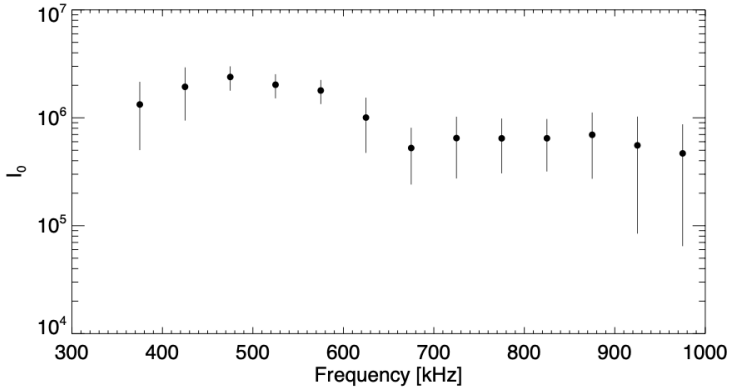



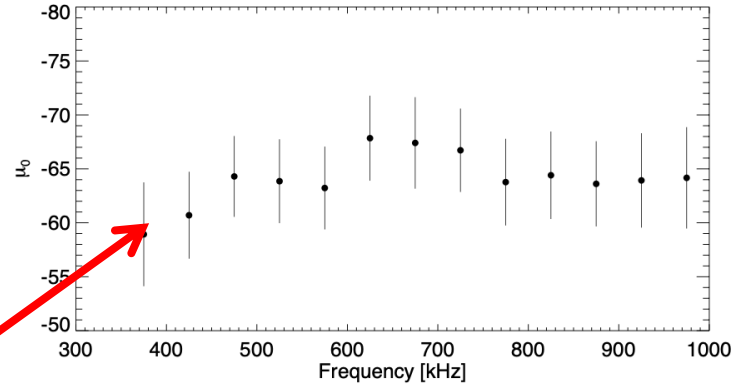

What is the location of the Type III source as a function of frequency?

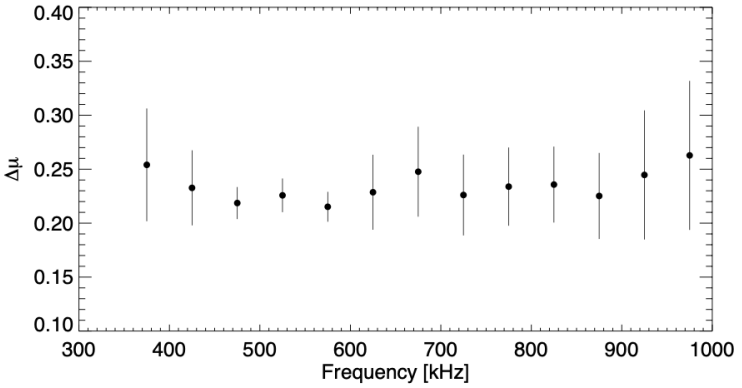
What is the role of turbulence/scattering?

# Radio flux for 4 s/c



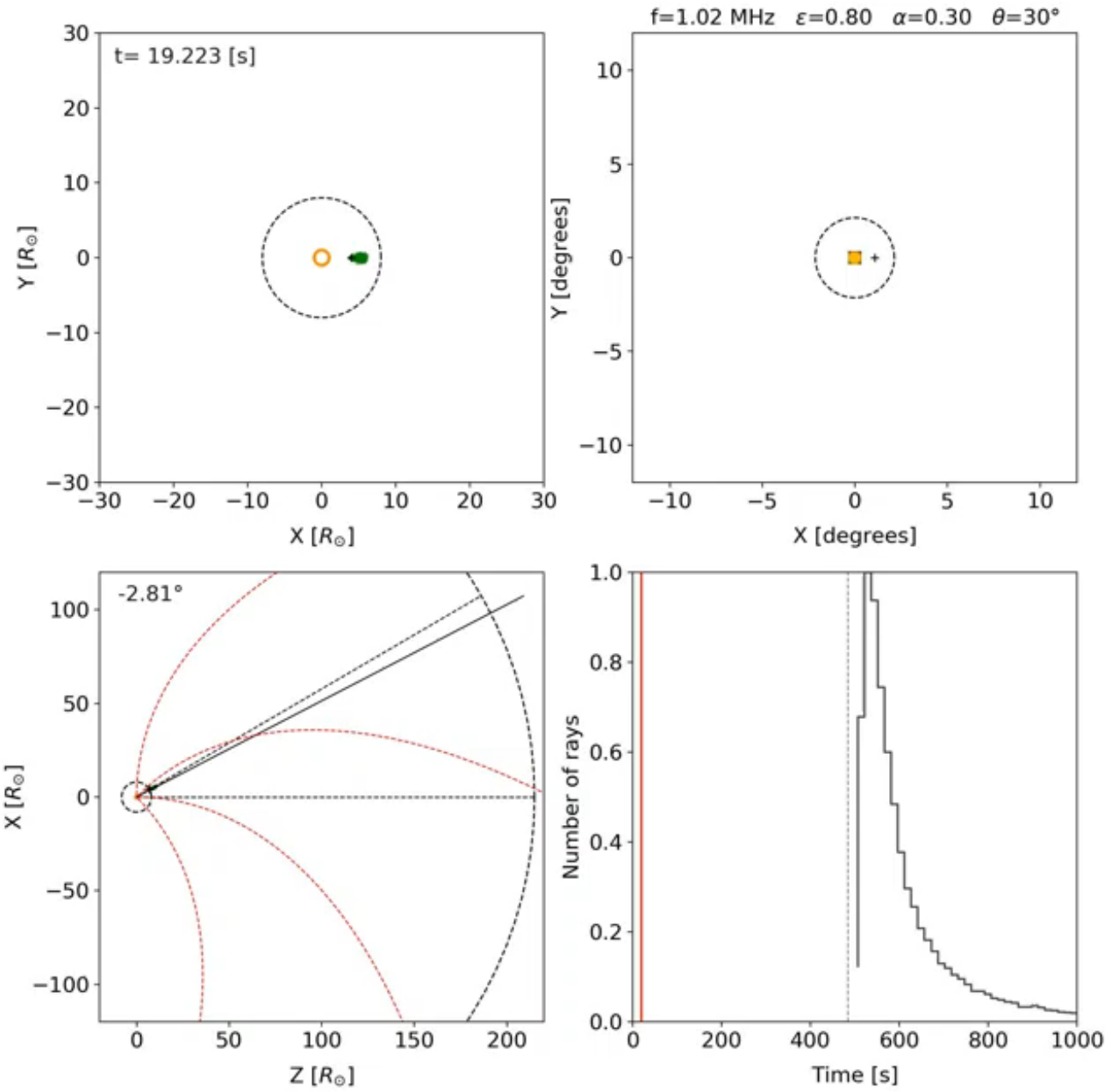

$$I_i = I_0 \exp\left(\frac{\cos(\mu_i - \mu_0) - 1}{\Delta\mu}\right)$$

See Musset et al 2021

=> Emission direction

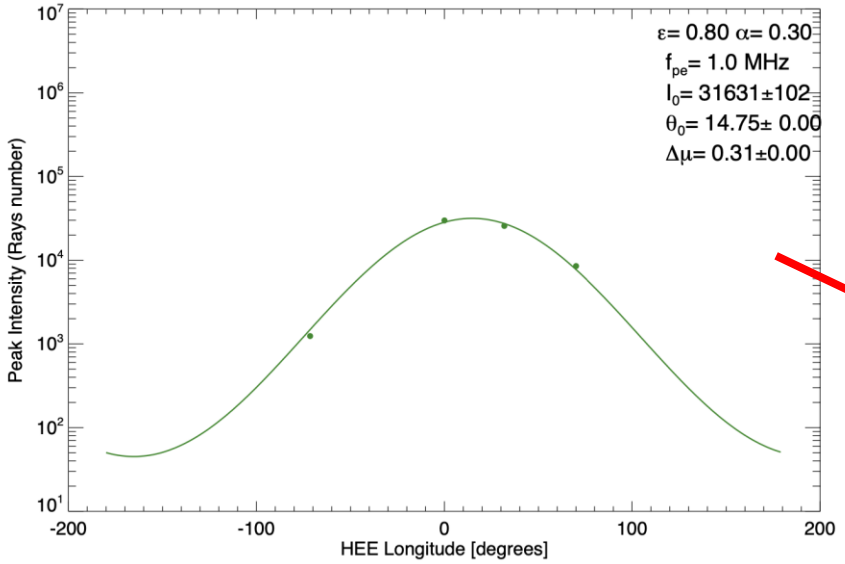
=> Turbulence anisotropy/level

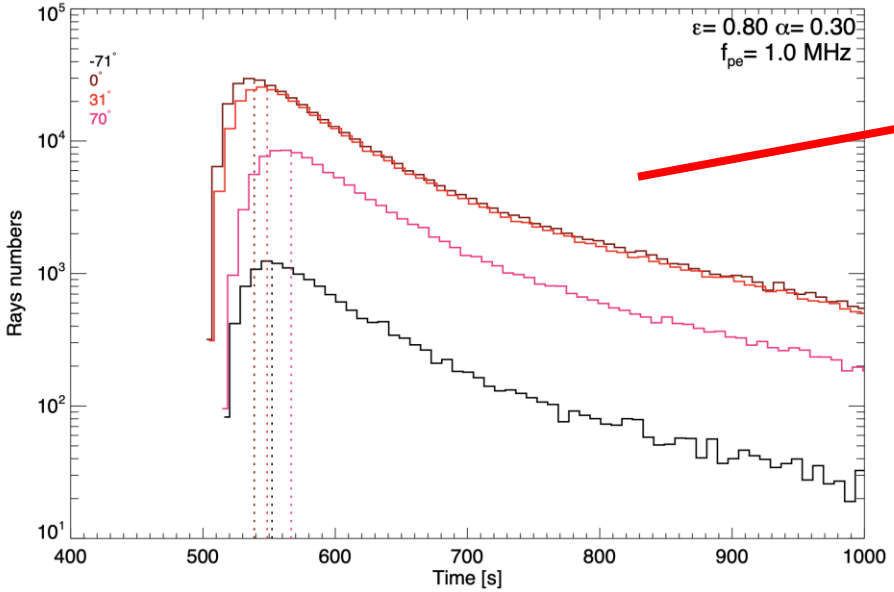
# Animation

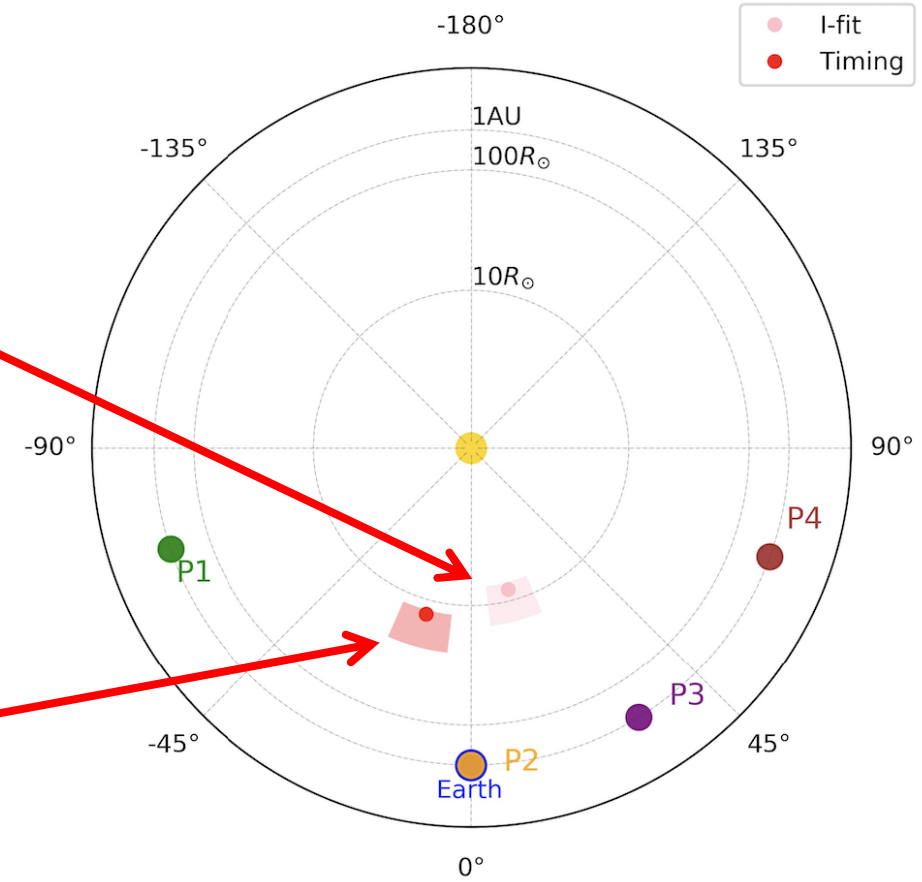



The radio-waves are scattered, so the radio wave source location is not the emission source. Magnetic field affects the dominant radiowave propagation

# Simulations: Timing vs flux fitting

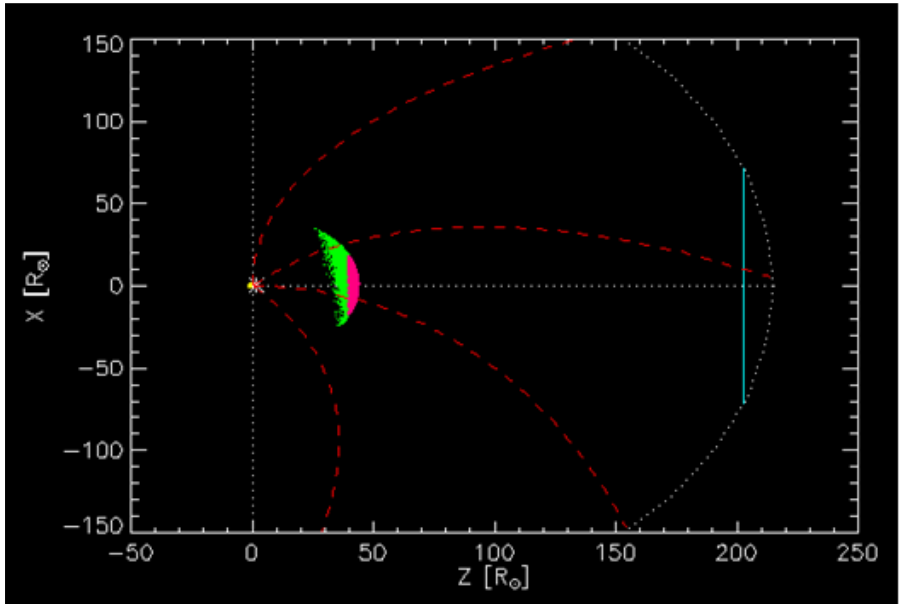


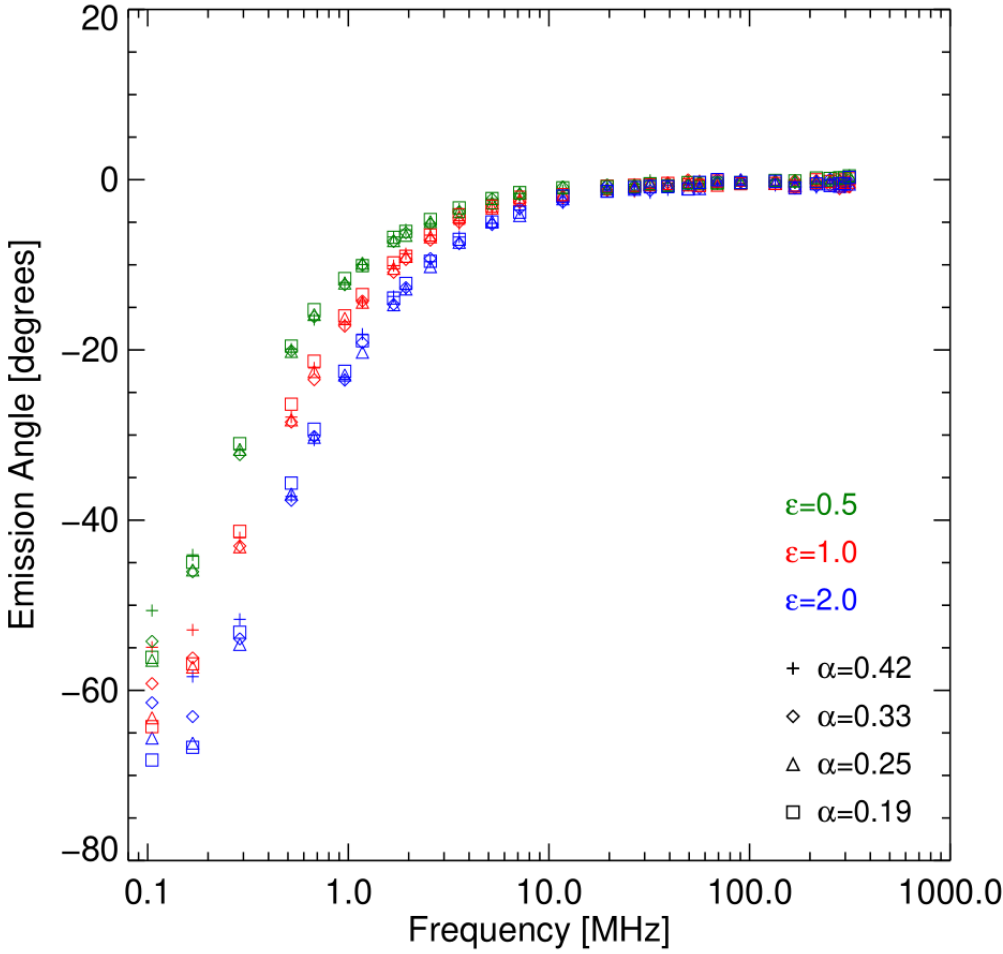




Note the difference!

# Parker spiral and anisotropic scattering




In anisotropic-field aligned turbulence the escaping radiation is affected by B-field geometry.



# Summary

- RPW observations in combination with other spacecrafts (ST-A, PSP, Wind) provide source locations
- Combination of simulations and observations is needed to interpret the observations
- New diagnostics of magnetic field (anisotropic scattering guiding the radio-waves)
- Although timing analysis and 4 s/c intensity analysis provides roughly similar directions; the results are not the same (scattering prevents )

# Extra slides ...