Electron density measurements from the Shot Noise collected on the S/Waves Antennas (Work done by Ioannis Zouganelis et al.)
The thermal noise spectroscopy

2 Maxwellians:
cold: \( n_c, T_c \)
hot: \( n_h, T_h \)

Shot Noise
Need for antenna longer than the Debye length

Meyer-Vernet & Perche, 1989
The antenna is too short (we knew) but also too thick …
\[ V_I^2 = 2e^2 N_e |Z|^2 \]
\[ N_e = (4\pi)^{-1/2} n_e v_{th} S \]
\[ V_{obs}^2 = \frac{V_e^2 + V_p^2 + V_I^2}{\Gamma^2} \]
\[ \Gamma = \frac{Z_R + Z}{Z_R} \]
\[ Z_R \approx \frac{1}{iC_b \omega} \]
\[ Z = R + \frac{1}{iC \omega} \]

Determination of Cb, which is hard to model
Comparisons with Plastic Np

ST_A 2007-05-25

$\frac{n_e}{(\text{cm}^{-3})}$

ST_A 2007-04-20

$\frac{n_e}{(\text{cm}^{-3})}$
• Should remove the background
• Should compare with the antenna potential monitor
• Basically LFR could probably measure Ne with about 30 to 40 % accuracy and give a rough estimate of Te
• Tcore determination probably not possible with thermal noise because of shot noise