

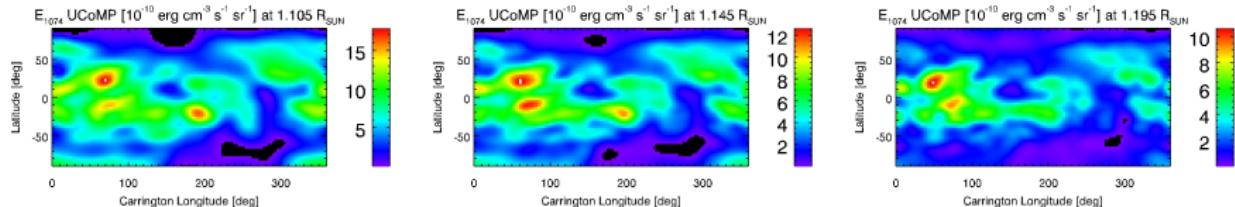
Tomography: UCoMP versus AIA versus KCOR

- Solar rotational tomography (SRT) makes use of 1/2 solar rotation (14-day) long sequences of coronal images to determine the 3D distribution of various physical quantities of the corona, depending on the observed wavelength range.
- Using WL pB images (e.g. KCOR, C2, Metis), SRT allows determination of the 3D N_e .
- Using EUV images with a given filter (e.g. AIA 171 Å), SRT allows determination of the 3D band-emissivity. Based on the reconstructed band-emissivity for various filters independently (e.g. AIA 171, 193, and 211 Å), a local-DEM analysis can be carried out at each location of the corona to determine the 3D N_e and T_e . The combined procedure is known as DEM-Tomography, or DEMT.
- Using UCoMP total-line (wavelength-integrated) images, SRT allows determination of the 3D line emissivity.
- For a specific period (September 2022), we carried out:
 - a) UCoMP-SRT with 1074 and 1079 nm images to determine their respective 3D emissivity maps. The 1074:1079 emissivity-ratio can then be used to determine 3D N_e .
 - b) AIA-DEMT (using filters 171, 193 and 211 Å) to determine the 3D N_e and T_e , in turn used with CHIANTI to compute 3D synthetic emissivity maps for the lines at 1074 and 1079 nm.
 - c) KCOR-SRT to determine the 3D distribution of N_e .
- These instruments allow reconstructions over a common range of heights $1.1 - 1.2 R_\odot$. We compare:
 - 1) The tomographic UCoMP-SRT line emissivities against the synthetic prediction based on AIA-DEMT.
 - 2) The 3D N_e derived from UCoMP-SRT, derived from AIA-DEMT, and derived from KCOR-SRT.

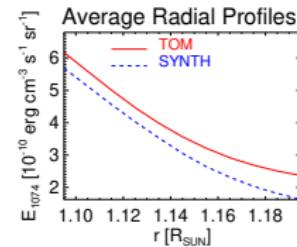
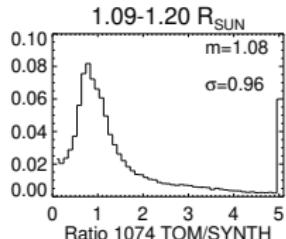
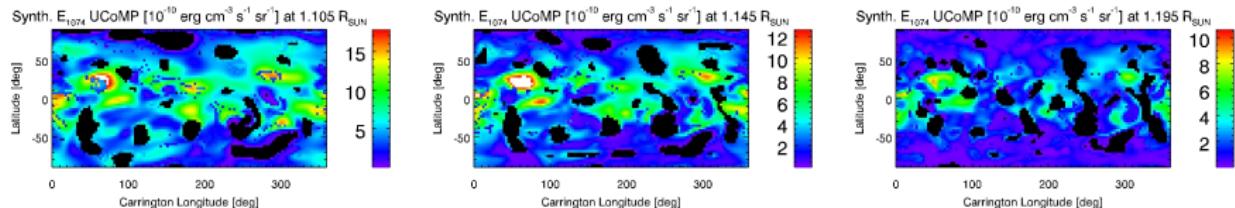
Fede: los resultados de las diapos 4 y 5 están copiados de la presentación que di en CO la visita pasada, entiendo que estos NO tienen el ajuste de KCOR. Cuando veas esto a la vuelta te pido actualices los gráficos (podés subirlos vos mismo al repo, con igual ombre, y avisarme que haga pull).

3D Coronal Emissivity at 1074 nm

Lat/Lon maps of UCoMP 3D **Tomographic** 1074-Emissivity

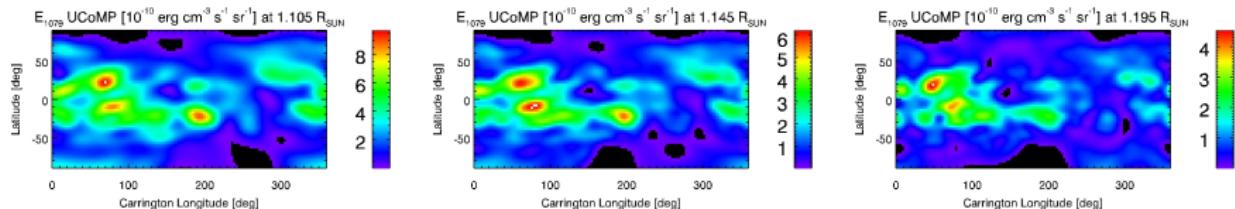


Lat/Lon maps of AIA(171-193-211)-DEMT 3D **Synthetic** 1074-Emissivity

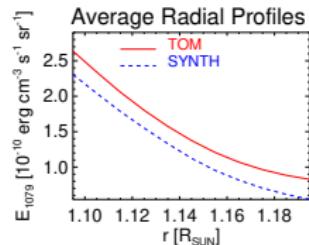
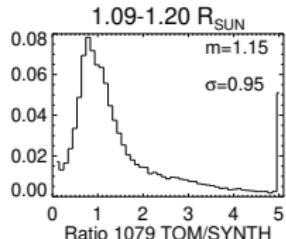
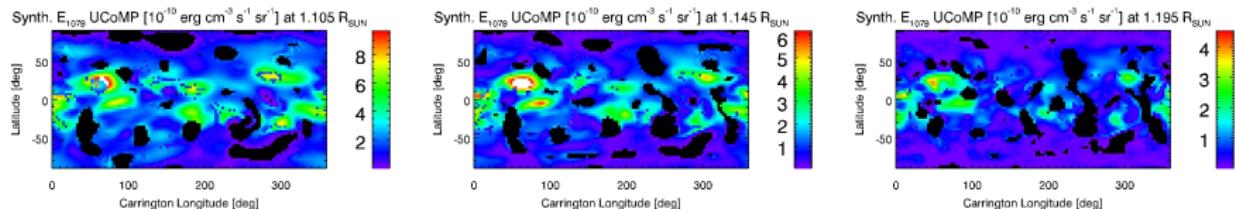


3D Coronal Emissivity at 1079 nm

Lat/Lon maps of UCoMP 3D **Tomographic** 1079-Emissivity

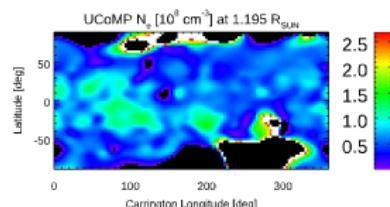
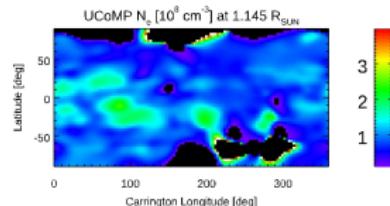
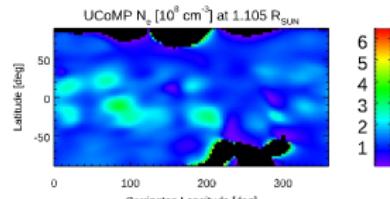


Lat/Lon maps of AIA(171-193-211)-DEMT 3D **Synthetic** 1079-Emissivity

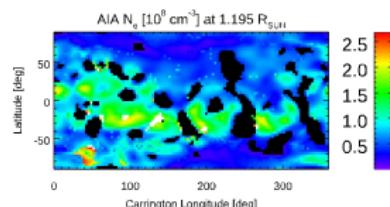
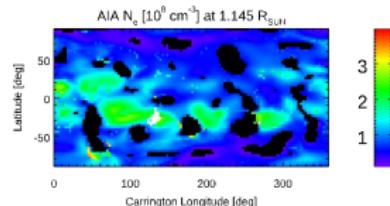
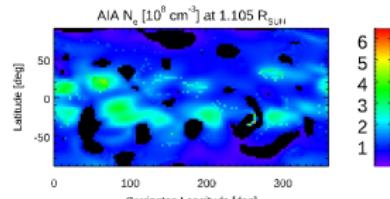


3D N_e with Three Diagnostics

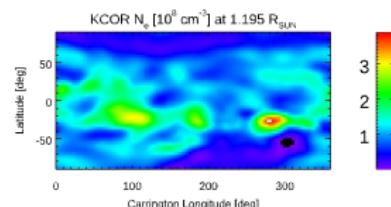
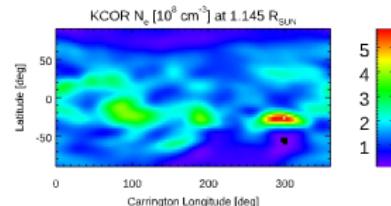
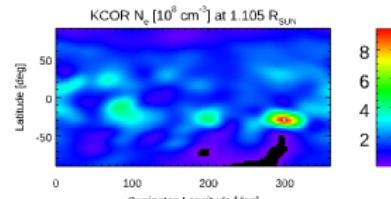
UCoMP-SRT



AIA-DEMT

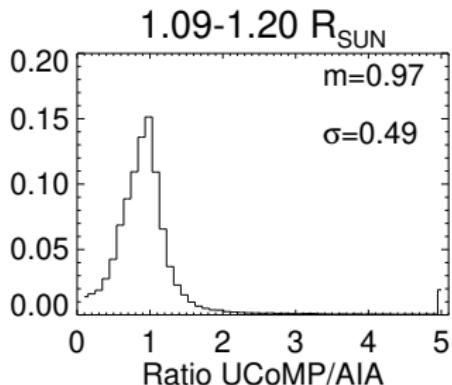


KCOR-SRT

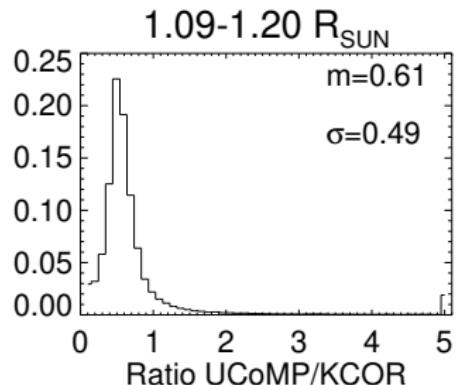


Comparison of Reconstructed N_e

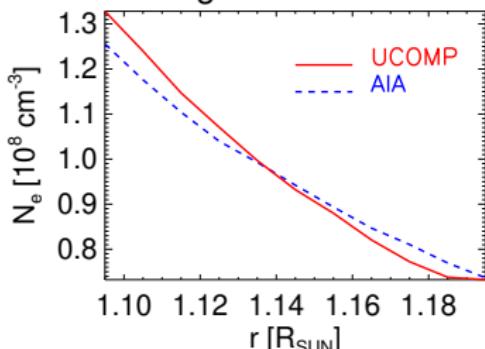
UCoMP versus AIA



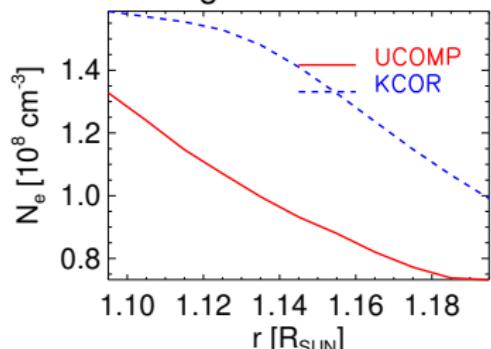
UCoMP versus KCOR



Average Radial Profiles



Average Radial Profiles



A Few Comments

- Emission lines to which UCoMP and AIA are sensitive are produced by Fe ions.
- While the UCoMP-SRT N_e is independent of [Fe], AIA-SRT $N_e \propto 1/\sqrt{[Fe]}$. Comparison of their reconstructed N_e can in principle provide constraints on the 3D distribution of [Fe], as well as the coronal filling factor affecting emission lines.
- The significantly larger SRT-KCOR N_e compared to SRT-AIA N_e has been consistently found for other periods ([Lloveras et al. 2019](#)). Discrepancy can be due to calibration issues, coronal [Fe], and/or coronal filling factor.