

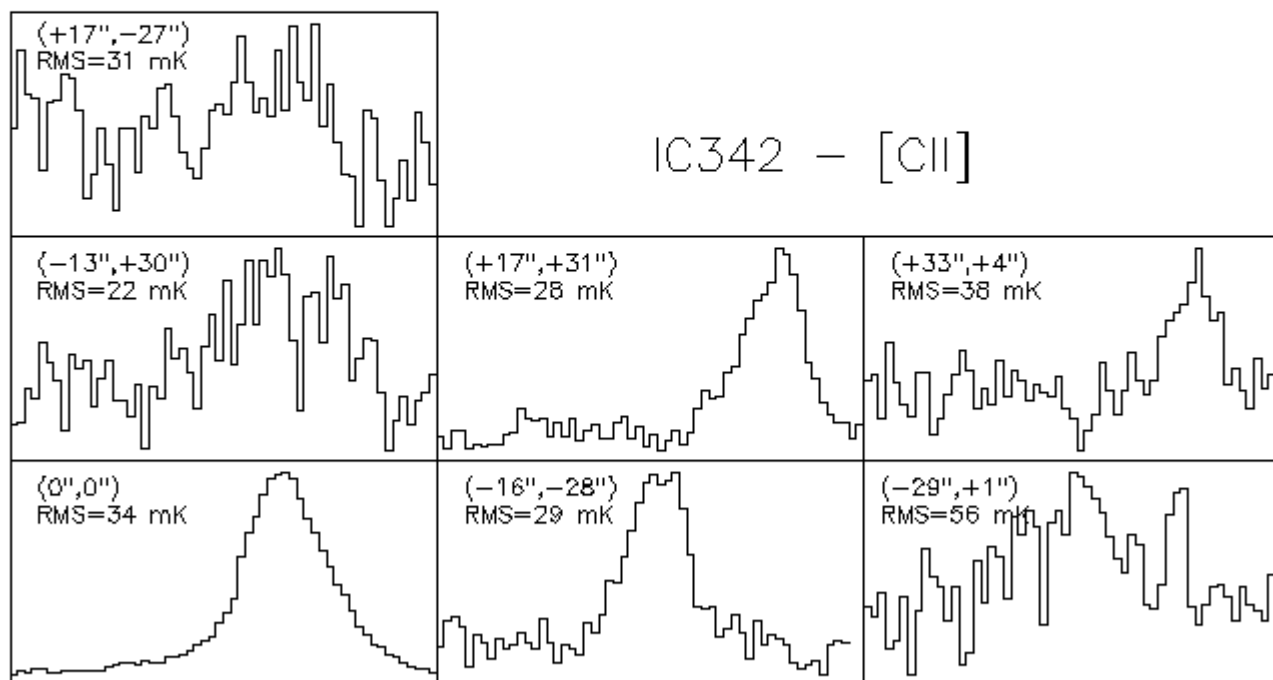
Proposal Identification	09_0030			
Project Title	The first unambiguous measurement of carbon depletion, via 158 micron [CII] absorption			
Principle Investigator	Dr. Clark Christopher	christoper.clark@usra.edu		
SMO contact person	R. Klein	rklein@sofia.usra.edu		
GREAT processing liaison	Dr. Rebeca Aladro	aladro@mpifr-bonn.mpg.de		
Observations				
Mission Identification	2022-04-09_GR_F853, 2022-04-23_GR_F858			
Flight date	2022-04-09, 2022-04-23			
GREAT configuration	front-ends: HFA, LFA	back-ends: XFFTS spectrometers		
Astronomical Sources	IC342	Scan	42109-42158 43001-43026	lines: CII_U OI_63_L
Calibrated data products based on: kosma_calibrator ver. Nov 2021, GILDAS software ver. Nov 2022				
product level	file name	description		
3	Cycle9_GR_OT_09_0030_CClark_Tant.great Cycle9_GR_OT_09_0030_CClark_Tmb.great	<p>Calibrated to T_A^* scale ($\eta_f = 0.97$).</p> <p>Calibrated to T_{mb} scale with:</p> <p>η_{mb} (LFAH) = (0.66, 0.64, 0.67, 0.69, 0.65, 0.65, 0.68);</p> <p>η_{mb} (LFAV) = (0.63, 0.64, 0.66, 0.63, 0.64, 0.64, 0.65);</p> <p>η_{mb} (HFA) = (0.65, 0.66, 0.69, 0.69, 0.70, 0.65, 0.70);</p> <p>The main beam temperature data file has been created with the script "Convert-Tant-to-Tmb.class"</p> <p>All scans have been quality validated.</p>		

4	<p>Cycle9_GR_OT_09_0030_CClark_IC342_CII.great Cycle9_GR_OT_09_0030_CClark_IC342_OI.great</p>	<p>Created with the scripts: Cycle9_GR_OT_09_0030_CClark_IC342_CII.class, and Cycle9_GR_OT_09_0030_CClark_IC342_OI.class</p> <p>1st order spectral baseline removed. Dropped Scans with Problematic Receiver response. Spectra smoothed to 5 km/s. Averaged spectra for [CII] and [OI]</p>
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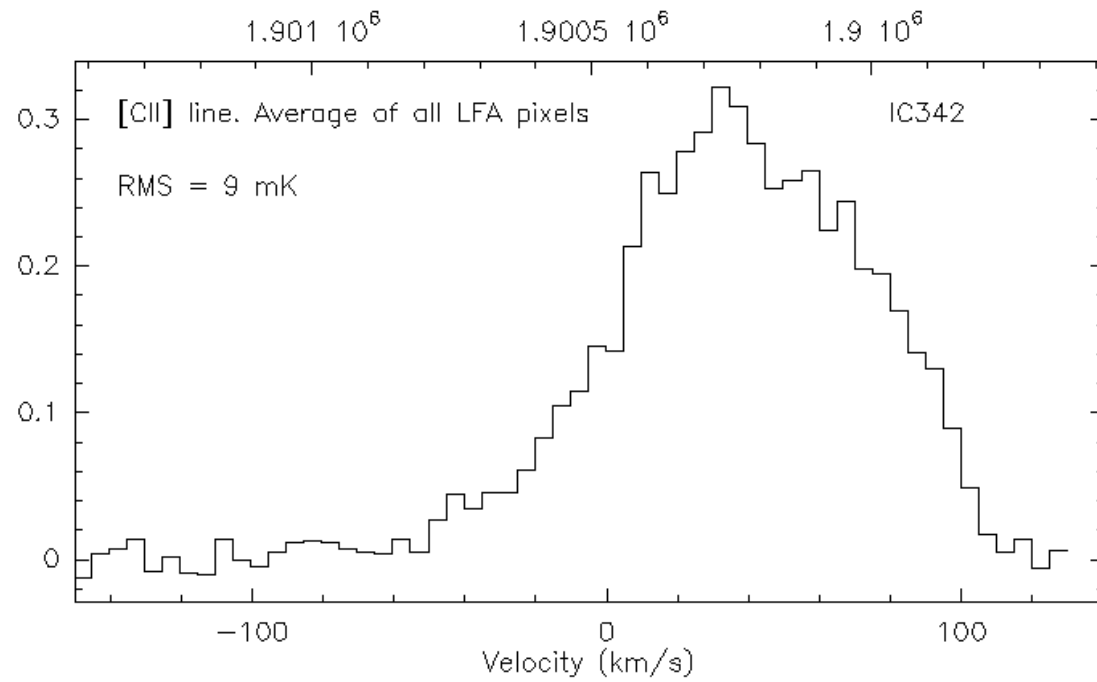
- Notes: (1) Heyminck, S. et al.: GREAT: the SOFIA high-frequency heterodyne instrument. *Astron.Astrophys.* 542, L1 (2012)
(2) Guan, X. et al.: GREAT/SOFIA atmospheric calibration. *Astron.Astrophys.* 542, L4 (2012)
(3) Risacher, C. et al.: First Supra-THz Heterodyne Array Receivers for Astronomy with the SOFIA Observatory. *IEEE Trans.TST* 6,199 (2016)
(4) Risacher, C. et al.: The upGREAT 1.9 THz multi-pixel high resolution spectrometer for the SOFIA Observatory, *Astron.Astrophys.* 595, 34 (2016)
(5) Durán et al., *IEEE Transactions on Terahertz Science and Technology*, vol. 11, issue 2, pp. 194-20

[CII] line

Each spectrum below is the average of the two linear polarisations of each LFA pixel. Values in the upper left corner indicate the pixel positions. The RMS of each spectra is indicated below. [CII] is detected at each position. The temperature escale is in Tmb (K).

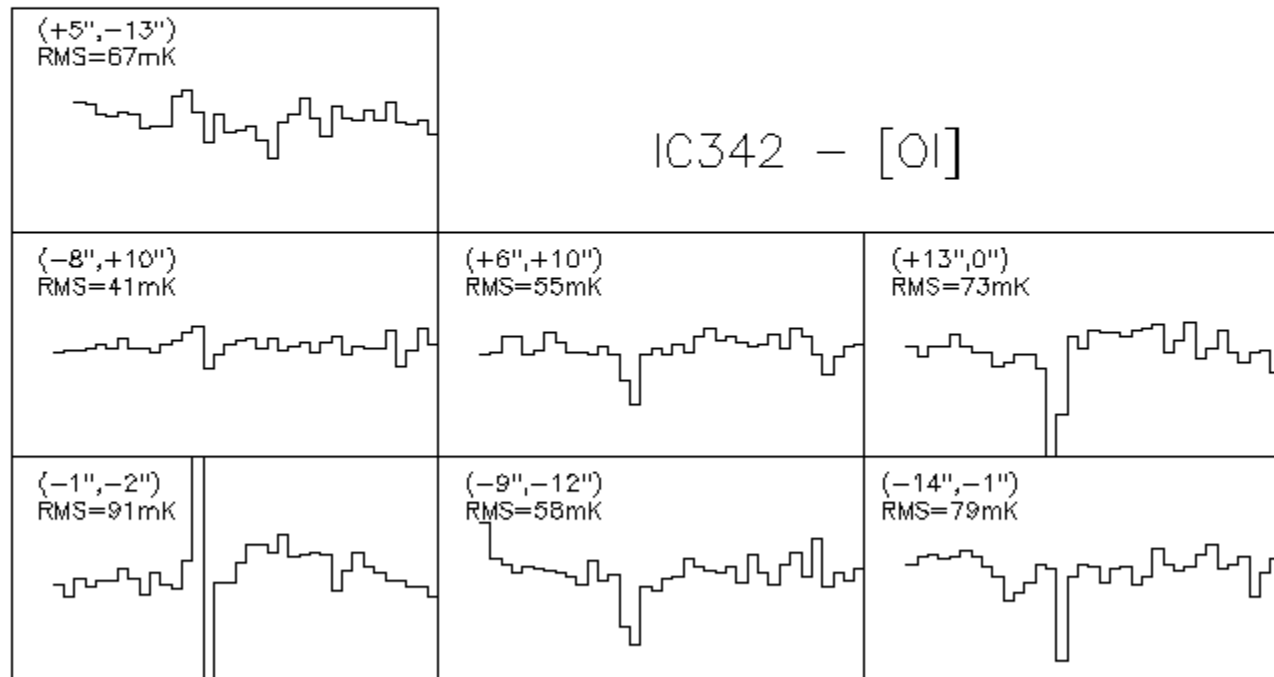


The spectrum below is the average of all the LFA pixels. The [CII] line is detected with a signal-to-noise ratio > 30. The temperature escale is in Tmb (K).



[OI] 63 micron line

The figure below shows the spectra obtained in each HFA pixel. Values in the upper left corner indicate the pixel positions. The RMS of each spectra is indicated below. Pixel 5 (at position [+13, 0]) is under pumped and its use is not recommended. Unfortunately, there is a telluric line entering from the signal band at the systemic velocity of IC342, -10 km/s. Irrespective of it, the [OI] line does not seem to be detected. The temperature escale is in Tmb (K).



The plot below shows the [OI] 63 micron line averaged over all HFA pixels, except pixel 5. The emission from IC342 is not detected. The telluric line appears in absorption. The temperature escale is in Tmb (K).

