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Authors	BIANCHI, SIMONE, Giovanardi, C., Smith, M. W. L., Fritz, J., Davies, J. I., Haynes, M. P., Giovanelli, R., Baes, M., Bocchio, M., Boissier, S., Boquien, M., Boselli, A., CASASOLA, VIVIANA, Clark, C. J. R., de Looze, I., di Serego Alighieri, S., Grossi, M., Jones, A. P., Hughes, T. M., HUNT, Leslie Kipp, Madden, S., MAGRINI, LAURA, Pappalardo, C., Ysard, N., ZIBETTI, Stefano
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J/A+A/597/A130 HI and 250um images of the Virgo cirrus (Bianchi+, 2017)

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The Herschel Virgo Cluster Survey.

XX. Dust and gas in the foreground Galactic cirrus.

Bianchi S., Giovanardi C., Smith M.W.L., Fritz J., Davies J.I.,
Haynes M.P., Giovanelli R., Baes M., Bocchio M., Boissier S., Boquien M.,
Boselli A., Casasola V., Clark C.J.R., De Looze I.,
di Serego Alighieri S., Grossi M., Jones A.P., Hughes T.M., Hunt L.K.,
Madden S., Magrini L., Pappalardo C., Ysard N., Zibetti S.

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=2017A&A...597A.130B (SIMBAD/NED BibCode)

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ADC_Keywords: Clusters, galaxy ; Photometry, millimetric/submm ;
Interstellar medium

Keywords: dust, extinction - radiation mechanisms: thermal -
infrared: ISM - submillimeter: ISM - radio lines: ISM -
local interstellar matter

Abstract:

We study the correlation between far-infrared/submm dust emission and atomic gas column density in order to derive the properties of the high Galactic latitude, low density, Milky Way cirrus in the foreground of the Virgo cluster of galaxies. Dust emission maps from 60 to 850um are obtained from SPIRE observations carried out within the Herschel Virgo Cluster Survey, complemented by IRAS-IRIS and Planck-HFI maps. Data from the Arecibo legacy Fast ALFA Survey is used to derive atomic gas column densities for two broad velocity components, low and intermediate velocity clouds. Dust emissivities are derived for each gas component and each far-infrared/submm band. For the low velocity clouds, we measure an average emissivity $\{\epsilon\}_{\nu}^{\text{LVC}} = (0.79 \pm 0.08) \times 10^{-20} \text{ MJy cm}^{-2} / \text{sr}$ at 250um. After fitting a modified blackbody to the available bands, we estimated a dust absorption cross-section $\{\tau\}_{\nu}^{\text{LVC}} / N_{\text{HI}} = (0.49 \pm 0.13) \times 10^{-25} \text{ cm}^2 / \text{H}$ at 250um (with dust temperature $T = 20.4 \pm 1.5 \text{ K}$ and spectral index $\{\beta\} = 1.53 \pm 0.17$). The results are in excellent agreement with those obtained by Planck over a much larger coverage of the high Galactic latitude cirrus (50% of the sky vs 0.2% in our work). For dust associated with intermediate velocity gas, we confirm earlier Planck results and find a higher temperature and lower emissivity and cross-section. After subtracting the modelled components, we find regions at scales smaller than 20' where the residuals deviate significantly from the average, cosmic-infrared-background dominated, scatter. These large residuals are most likely due to local variations in the cirrus dust properties (and/or the dust/atomic-gas correlation) or to high-latitude molecular clouds with average $N_{\text{H}_2} \sim 10^{20} \text{ cm}^{-2}$. We find no conclusive evidence for intracluster dust emission in Virgo.

Description:

Images of the Virgo cirrus in the atomic gas HI emission and in the dust emission at 250um from Herschel-SPIRE. Two images are provided for HI emission from low velocity (LVC; $-20 \text{ km/s} < v < 100 \text{ km/s}$) and intermediate velocity (IVC; $-100 \text{ km/s} < v < -20 \text{ km/s}$) clouds. The images are the same presented in the left and mid panels of Fig. 3 in the paper. Three images are provided at 250um: the observations, with large scale offsets removed; the model, obtained from the emissivity values derived in the paper and the two atomic gas maps; the residuals between observations and models. The three images have been obtained from observations/model/residuals for each of the four HeViCS fields, and combined in a single large scale map after removing field-to-field offsets; they are the same presented in Fig. 8 of the paper. In all cases the resolution is 4.8'.

File Summary:

FileName	Lrecl	Records	Explanations
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ReadMe          80      .   This file
list.dat        94      5   List of fits images
fits/*          .       5   Individual fits images

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See also:

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J/AJ/90/1681      : The Virgo Cluster Catalog (VCC) (Binggeli+, 1985)
J/MNRAS/419/3505  : The HeViCS Bright Galaxy Sample (Davies+, 2012)
J/MNRAS/428/1880  : FIR properties of VCC galaxies (Auld+, 2013)
J/A+A/552/A8      : 454 VCC galaxies revised coord. (di Serego Alighieri+ 2013)
J/A+A/573/A129    : HeViCS. SPIRE point-source catalogs (Pappalardo+, 2015)
J/A+A/574/A126    : HeViCS. XVIII. Star-forming dwarf galaxies (Grossi+, 2015)

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Byte-by-byte Description of file: list.dat

Bytes	Format	Units	Label	Explanations
1- 9	F9.5	deg	RAdeg	Right Ascension of center (J2000)
10- 18	F9.5	deg	DEdeg	Declination of center (J2000)
20- 21	I2	arcsec/pix	scale	Scale of the image
23- 25	I3	---	Nx	Number of pixels along X-axis
27- 29	I3	---	Ny	Number of pixels along Y-axis
31- 33	I3	Kibyte	size	Size of FITS file
35- 46	A12	---	FileName	Name of FITS file, in subdirectory fits
48- 94	A47	---	Title	Title of the FITS file

Acknowledgements:

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Cortese et al.,         Paper II     2010A&A...518L..49C
Clemens et al.,         Paper III    2010A&A...518L..50C
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Corbelli et al.,        Paper X      2012A&A...542A..32C
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Auld et al.,            Paper XII    2013MNRAS.428.1880A, J/MNRAS/428/1880
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Grossi et al.,          Paper XVIII  2015A&A...574A.126G, J/A+A/574/A126
Pappalardo et al.,      Paper XIX    2016A&A...589A..11P

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(End) Simone Bianchi [INAF-OAA, Italy], Patricia Vannier [CDS] 20-Oct-2016