J/A+A/597/A130 HI and 250um images of the Virgo cirrus (Bianchi+, 2017)

The Herschel Virgo Cluster Survey.
XX. Dust and gas in the foreground Galactic cirrus.

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di Serego Alighieri S., Grossi M., Jones A.P., Hughes T.M., Hunt L.K.,
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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}^LVC=(0.79+/-0.08)*10^-20^MJy.cm^2^/sr at 250um. After fitting a modified blackbody to the available bands, we estimated a dust absorption cross-section {tau}_{nu}^LVC/N_HI_=(0.49+/-0.13)*10^-25cm^2^/H at 250um (with dust temperature T=20.4+/-1.5K and spectral index {beta}=1.53+/-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_H2_<~10^20^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; -20km/s<v<100km/s) and intermediate velocity (IVC; -100km/s<v<-20km/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

```
ReadMe            80        .   This file
list.dat          94        5   List of fits images
fits/*             .        5   Individual fits images
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See also:
 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)

Byte-by-byte Description of file: list.dat
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   Bytes Format Units   Label     Explanations
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   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
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Acknowledgements:
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  Clemens et al.,             Paper III   2010A&A...518L..50C
  Smith et al.,               Paper IV    2010A&A...518L..51S
  Grossi et al.,              Paper V     2010A&A...518L..52G
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  de Looze et al.,            Paper VII   2010A&A...518L..54D
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  Pappalardo et al.,          Paper XVII  2015A&A...573A.129P, J/A+A/573/A129
  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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