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The Herschel Multi-Tiered Extragalactic Survey: HerMES

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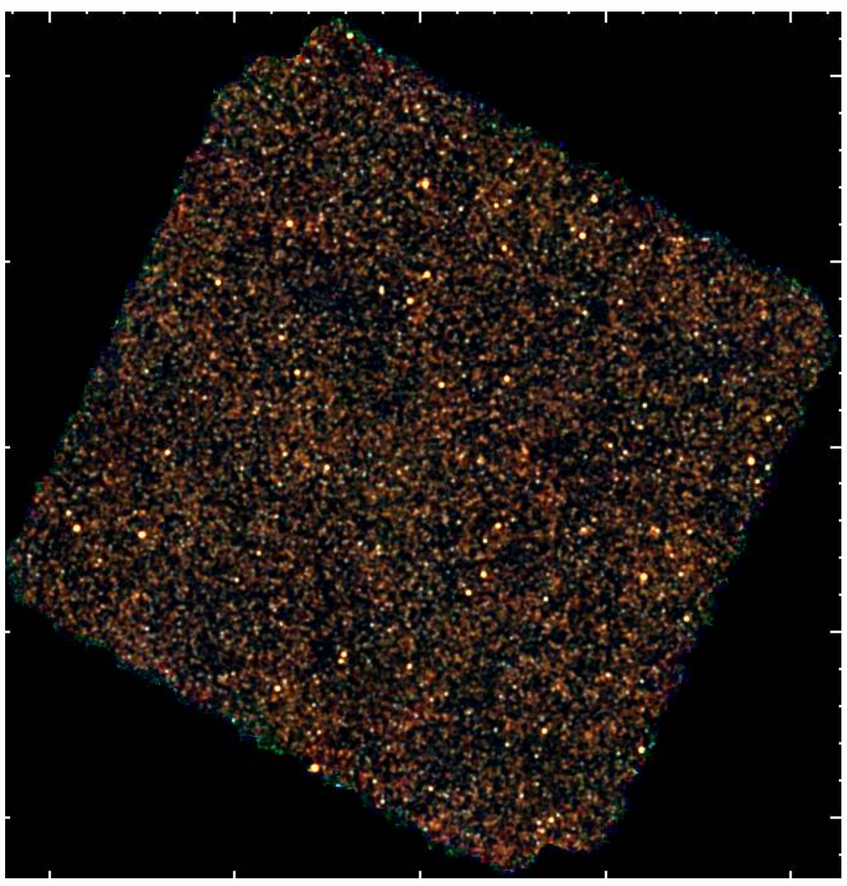
One of the primary motivations for Herschel was to explore star formation in the distant Universe. Herschel thus invested a significant fraction of its time undertaking a multi-tiered extragalactic survey, HerMES. HerMES mapped around 400 deg^2 in the best studied extragalactic fields on the sky and has uncovered 100s of thousands of distant star forming galaxies. HerMES will be a huge legacy of Herschel, providing many insights into the cosmic evolution of star formation.

Spot the Difference

A



These images are RGB versions of SPIRE 250, 350 and 500μm maps of the HerMES COSMOS field.

One is the real image.

One is a simulation based on an extended halo model of galaxies including their luminosities and clustering which fits the SPIRE P(D) and cross Power Spectra (see below).

Which is which?

Vote now

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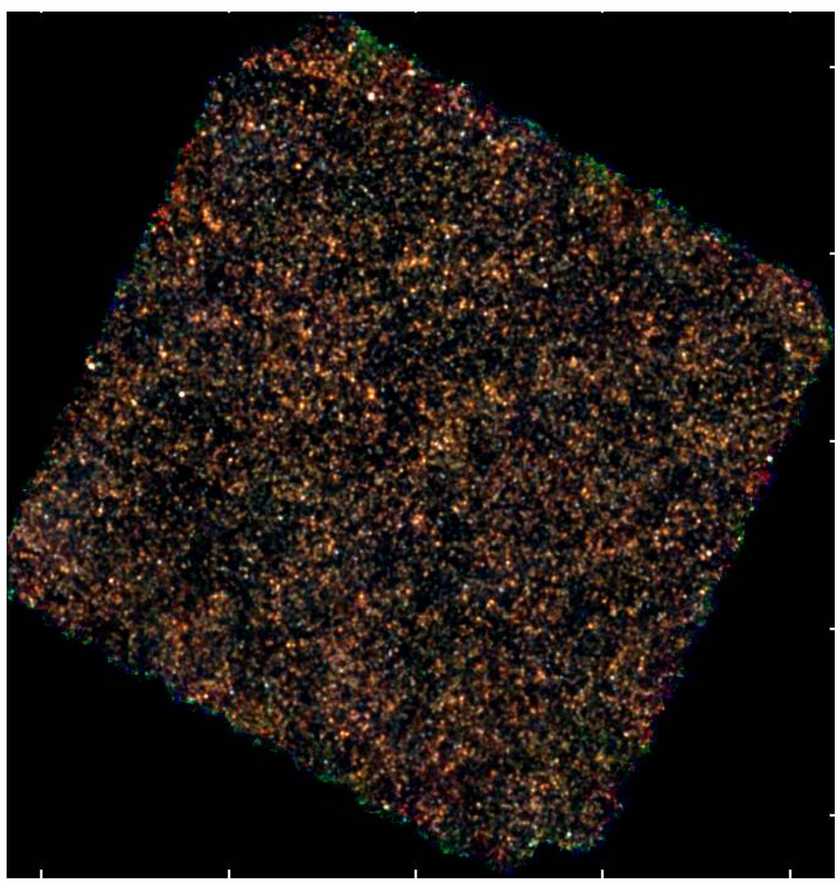
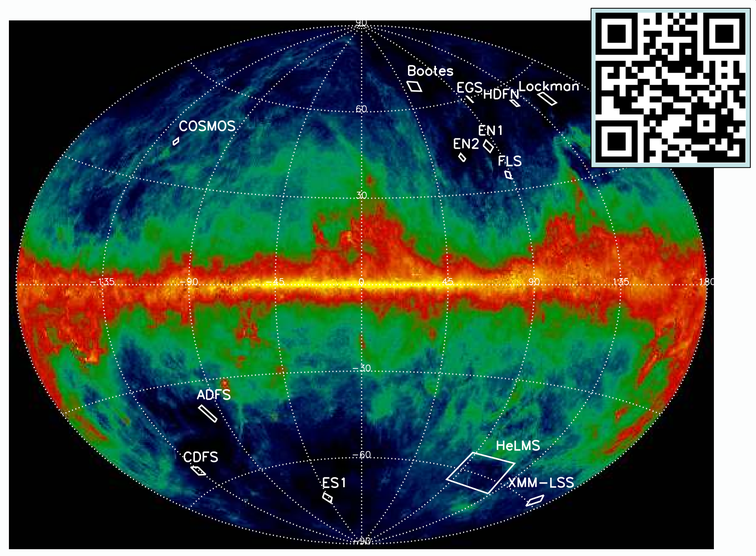
B



HerMES highlights

- **Maps contain most of the signal in peak of CIRB**
  e.g. Nguyen et al. 2010, Glenn et al. 2010, Bethermin et al. 2012
- **Constraining full FIR luminosity & SEDs**
  e.g. Symeonidis et al. 2013
- **Powerful constraints on Luminosity Funcitions & cosmic SFR density**
  e.g. Vaccari et al. 2010, Casey et al. 2012, Gruppionni et al. 2013
- **Progenitors of massive galaxies**
  e.g. Cooray et al. 2010, Amblard et al. 2011, Viero et al. 2013
- **SPIRE preferentially picks up SF not AGN torus,**
  e.g. Hatziminaoglou et al. 2010
- **Suppression of star formation in high Lx AGN**
  e.g. Page et al. 2012
- **Discovery of very high-z, star burst galaxies**
  e.g. Riechers et al. 2013
- **Lensing**
  e.g. Conley et al. 2011, Wardlow et al. 2013



400 deg^2 in 13 locations over ~7 depths. Survey description in Oliver et al. 2012

Progenitors of massive galaxies

- **Large high fidelity maps**
  The fast mapping speed and well behaved noise properties of Herschel-SPIRE (Griffin et al. 2010) enable accurate measurement of the clustering of high-z FIR galaxies.
- **Clustering measurements**
  HerMES have measured clustering in catalogues (Cooray et al. 2010), maps (Amblard et al. 2011) and the cross-power spectrum between SPIRE bands (250, 350, 500μm, Viero et al. 2013). We have made robust measurements of the small-scale "1-halo term"
- **Linking to descendants**
  The clustering statistics of the galaxies are related to the clustering of their dark matter halo hosts. Dark matter evolution is well understood and thus we can link the FIR galaxies to their descendants today
- **A new model characterisation of FIR galaxy populations**
  We are able to construct an extended halo model of galaxies describing galaxy populations and their evolution which fits the clustering results (Viero et al. 2013) and the P(D) (Glenn et al. 2011). This finds that the halo mass that is most effective for star formation is $\log(M_{peak}/M_{\odot}) \sim 12.1 \pm 0.5$ (Viero et al. 2013).
- **Synthetic maps**
  This model is being used to generate highly realistic synthetic data sets, as seen above (Wang et al. 2013).

HerMES Data releases

2013 October **Second data release (DR2)**
SPIRE maps and catalogues from all fields from levels 1-6

2012 April 3rd, **First data release (DR1) of HerMES data.**
The maps cover ~74 deg^2 of the sky, i.e. a volume of 6.6e8 (Mpc)^3 for z<1.5 (and many of the galaxies that we see are expected to be at z>1.5) q.v. the SDSS which maps a volume of 3.5e8 (Mpc)^3 for z<0.17.
The catalogues extracted from these maps include over 50, 000 catalogue entries, representing over 17,000 galaxies.

2011 Sept.19th, **Second *Early Data Release* of HerMES data.**

2010, July 1st, **First release of data.**

hedam.lam.fr/HerMES/

HeDaM Herschel Database in Marseille

HerMES @ The Universe explore by Herschel

Number	Title/Author
6a 10:20	On the Redshift Evolution (0 < z < 4) of Dust Attenuation and of the total (UV+IR) Star Formation Rate Density
	D. Burgarella et al.
7a 12:20	HerMES: Herschel/SPIRE-Selected Massive Starburst Galaxies at very high Redshifts
	I. Perez-Fournon et al.
P06	HERMES: Unveiling Obscured Star Formation in Ultraviolet Selected Galaxies from z=1.5 to z=4
	Buat, V.
P08	Multivariate Analysis of the SPIRE Maps: Using Principle Component Analysis as a Basis for P(D) Fluctuation Analysis
	Clarke, C. L. et al.
P18	The Herschel PEP/HerMES Luminosity Function: Probing the Evolution of PACS selected Galaxies to z~4
	Gruppioni, C. et al.
P26	Infrared SEDs and Morphologies of Herschel Selected Galaxies in the COSMOS Field
	Lee, N. et al.
P29	The Evolving ISM of Star Forming Galaxies Over the Last 10 Billion Years
	Magdis, G. E. et al.
P31	The Deepest Herschel View of the Universe: Cosmic Star-Formation History and Dust Temperatures of Galaxies up to z=2
	Magnelli, B. et al.
P33	The Herschel Multi-Tiered Extragalactic Survey: HerMES
	Oliver, S. et al.
P35	QSOs, Winds and Star Formation: X-Ray and Submillimetre Observations of AGN in the Epoch of Galaxy Formation.
	Page, M. et al.
P40	HeDaM: The Herschel Database in Marseille
	Roehlly, Y. et al.
P48	The Herschel Census of Infrared SEDs through Cosmic Time
	Symeonidis, M. et al.
P50	The Evolution of the FIR/SMM Luminosity Function and of the Cosmic Star Formation Rate Density of SPIRE-Selected Galaxies
	Vaccari, M. et al.
P52	Gravitationally Lensed Galaxies Detected by HerMES
	Wardlow, J. et al.
P53	Star Formation Enhancement In Close Major-Merger Pairs with z < 1
	Xu, C.K.

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HerMES is a Herschel-SPIRE guaranteed time project.

All HerMES publications on ADS here

http://bit.ly/GNPZR6

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