Curriculum vitae et studiorum

Stefano Berta

Updated: November 21st, 2018

First–Name:	Stefano
Family Name:	Berta
Place of birth:	Genova (Italy)
Year of birth:	1975
Nationality:	Italian

Highest Degree:	PhD Astronomer
Languages:	Italian English German French
Experience:	Scientific research Programming and software testing Lead of small teams Preparation of papers and reports Referee for scientific journals Talks and presentations at conferences University courses for undergraduates Master-theses supervisor Guide at museum exhibitions

Education and Carrer Path:

09/2018– –now	**Astronomer** at Institut de Radioastronomie Millimétrique (IRAM), Grenoble, working for data reduction and communication for the NIKA2 instrument, and extragalactic surveys.
05/2016– –08/2018	Sabbatical and parental time; development of new projects; 3-component SED fitting code; visitor scientist at the Physics Department, Zagreb University.
09/2007– –04/2016	**Scientist** position and Post Doctoral fellowship at Max Planck Institut für Extraterrestrische Physik, analysing *Herschel* data of extragalactic surveys.
2006	**Post-Doctoral** Scholarship at the Center for Astrophysics and Space Sciences (CASS), UCSD; supervisors Prof. H. E. Smith and Dr. C. J. Lonsdale.
07/2005– –06/2007	**Post Doctoral** fellowship at Padova Astronomy Department. Research project on "Multiwavelength study of *Spitzer*/SWIRE faint galaxies".
18/03/2005	**PhD degree in Astronomy**, Padova University. title of PhD thesis: "Multiwavelength analyses of faint infrared galaxies"; supervisors Prof. A. Franceschini and Dr. C.J. Lonsdale (IPAC, CalTech).
29/06/2001	**Graduate degree in Astronomy**, Padova University (Italy). Title of Thesis: "Spectroscopic study of star forming galaxies in the *Hubble Deep Fields*"; supervisor Prof. A. Franceschini; full mark: 110/110

Languages

Italian: mother tongue
English: fluent
German: very good
French: basic

IT knowledge

Operating systems: UNIX, Linux, Windows.

Programming languages: Fortran, Super Mongo, Awk & Shell.

Word processing: Latex, Microsoft Word/Excel/PowerPoint, HTML.

Astronomical Data reduction & analysis packages: IRAF, ECLIPSE, SExtractor, Starfinder, EAZY, Hyper-z, MAGPHYS, etc.; several custom codes to perform SED fitting with different models, and other pieces of analysis.

Observational Experience

VLT/ISAAC	near-IR spectroscopy of high-redshift star forming galaxies;
NTT/SOFI	near-IR spectroscopy of local starbursts and AGNs; near-IR imaging survey of a blank field;
Palomar/220"	multislit spectroscopy of intermediate-redshift star forming (SF) galaxies, with the COSMIC camera;
Keck/LRIS	multislit spectroscopy of high-redshift SF galaxies;
LBT	near-IR and optical, MOS and long-slit spectroscopy of galaxies with the LUCI and MODS instruments.
NIKA2/30m	millimetric continuum observations of different source types.

Reduction of Astronomical data

a) Mosaic (wide field) optical deep imaging (WFI@2.2m), including detailed study of astrometric corrections and photometric calibration, related to the ESO Large Programme "ESO-SIRTF wide-area Imaging Survey" (ESIS, http://dipastro.pd.astro.it/esis);
b) Wide-area mosaic deep imaging with VIMOS@VLT, including detailed study of distortions, mosaicking problems and fringing, within the ESIS survey;
c) Optical Mosaic images obtained with the MOSAIC2 instrument at CTIO;
d) Near-Infrared imaging (SOFI@NTT);
e) Optical spectroscopy (EFOSC@3.6m) of local ULIRGs;
f) Near-Infrared spectroscopy (SOFI@NTT, ISAAC@VLT) of low-redshift

ULIRGs and high-z IR galaxies;

g) multi-slit spectroscopy of faint galaxies (FORS1@VLT, FORS2@VLT, EMMI@NTT, COSMIC@Palomar, LRIS@Keck);
h) optical spectropolarimetry of ULIRGs with Wollastone prism (EFOSC@3.6m).
i) millimeter continuum observations with NIKA2@30m (IRAM).

Analysis of Astronomical data

a) custom SED fitting. I developed a code performing simultaneous 3-components fits, icnluding stars, dust, AGN.
I have written codes to work with Draine & li (2007) models, modified-BB models, and simple template libraries. I have developed UV-to-submm templates (Berta et al 2013a) and I have familiarity with several others.
b) SED fitting with population synthesis codes, aimed at deriving stellar masses and SFR.
c) SED fitting: Hyper-z, EAZY, MAGPHYS, GraSil, etc.
d) photometric redshifts: Hyper-z, EAZY.
e) source extraction (UV, optical, near-IR, mid-IR), using SExtractor, Starfinder, Daophot, or perfoming multi-wavelength (UV to mid-IR) PSF-matching (ConvPhot). This includes simulations to derive completeness, reliability, etc.
f) far-IR source extraction (blind) using Starfinder or Daophot, including simulations.
g) catalogs building: matching wavelengths, PSFs, apertures, etc.
h) Building luminosity and mass functions, using the $V_{\rm max}$ or Bayesian STY methods.

Selected, recent Conferences

Sep. 2015 "Modeling galaxies through cosmic times" (Cambridge, UK): oral contribution "Testing our ignorance in measuring dust masses".

May 2015 "Gas and dust in Star forming galaxies" conference (Crete, GR): oral contribution "Dust and Gas in high-z Herschel galaxies".

Apr. 2015 "ALMA/Herschel workshop" (ESO, Garching, D): oral contribution "The ALMA legacy of Herschel deep surveys".

Jun. 2013 "A Panchromatic View of Galaxy Evolution" (Pafos ,CY): invited, oral contribution "Infrared Surveys".

Oct. 2011 "EXGAL2011" conference (Pasadena, USA): oral contribution "The properties of Herschel/PEP star forming galaxies".

Sep. 2011 "FIR2011" conference (London, GB):
oral contribution "Herschel/PEP: not only high-z star formation".

Nov. 2010 ALMA/Herschel workshop (Garching, D):
oral contribution "Dissecting the CIB with Herschel/PEP".

Nov. 2010 "Cosmic Radiation Fields" conference (Hamburg, D):
oral contribution "Dissecting the CIB with Herschel/PEP".

Oct. 2010 "Galaxy Evolution: IR to mm perspective" conference
(Guilin, CN): oral contribution "Dissecting the CIB with Herschel/PEP".

Sep. 2010 "Evolution of galaxies, BH and LSS" conference (Potsdam, D):
oral contribution "Herschel, PEP and galaxy evolution".

May 2010 ESLAB, Herschel first results conference (Nordvjik, NL):
oral contribution "PEP: Dissecting the cosmic IR background".

Oct. 2008 ESO Workshop on Large Programmes
(Garching, D): invited oral contribution "ESIS: The ESO-Spitzer
wide-area imaging survey".

Professional Refereeing and Observing Panels

since 2011 Referee for the journal *Nature*
since 2011 Referee for the journal *Astronomy & Astrophysics*
since 2010 Referee for the *Monthly Notices of the Royal Astronomical Society*
since 2008 Referee for the *Astrophysical Journal*

P91-92 Advisor for the Cosmology Panel of ESO OPC.

Conferences Organization

2006 Member of L.O.C. of the conference "AGN-7"
(Montagnana (PD), Italy, May 23rd-26th, 2006).

2011 Member of L.O.C. of the conference "Star Formation in Galaxies:
the Herschel Era" (Ringberg Castle, Germany, June 19th-25th, 2011)

Teaching experience and tutoring work

June 2004, 2005, 2007 "Laboratory of Image Processing", 40 hours course for students attending the 2nd and 3rd year of Astronomy studies at the

	Padova University, financed by the European Social Fund.
July 2004 – – June 2005	Co-supervisor of Mr. S. Rubele's *Laurea* thesis on "Deep Galaxy Surveys in the ELAIS-S1 field", Padova University.
Dec. 2002 - - Oct. 2003	Co-supervisor of Mr. P. Repetto's *Laurea* thesis on "Modeling the infrared emission of Active Galactic Nuclei", Padova University.

Other working experiences

Tour guide at the historical Astronomical Observatory of Padua (1999 – 2002).

Tour guide during the exhibition "Mostra sulla Luna"
(Moon Exhibition) held in Padova (1999).

Translator, Interpreter

Poll clerk

Flyering

Main Roles in Astronomical Jobs

09/2018 – – now **Institut de Radioastronomie Millimétrique** mainly working on NIKA2 data

- understanding of data structure and content;
- testing and optimization of data reduction;
- extragalactic surveys with NIKA2 and NOEMA;
- communication of NIKA2 performance and results;
- SED fitting;
- ancillary datasets.

09/2007 – – 04/2016 **Max Planck Inst. f. Extraterrestrische Physik**, Infrared Group (lead by Prof. R. Genzel), working on far-infrared projects by the *PACS Evolutionary Probe* survey (PEP).

- Analysis of far-infrared (100-500 μm) images from the Herschel Space Telescope;
- source extraction from far-infrared images, using different techniques (aperture, PSF-fitting); characterization of completeness; multi-wavelength match; catalogs-building;
- coordination of the source extraction group of the PEP survey;
- statistical analysis of far-infrared catalogs; number counts; cosmic infrared background (CIB);
- building multi-wavelength catalogs (from the ultraviolet to the far-infrared), using the PSF-matching technique and a multi-wavelength ladder matching;
- analysis of SEDs of galaxies, from the UV to the far-IR, through modeling of stellar and dust emission; derivation of gas masses; gas cosmic volume density;
- study of photometric redshifts
- development of a custom code to reproduce the SEDs of galaxies with stellar, dust and AGN (active galactic nuclei) emission, using bayesian and Monte Carlo techniques;
- preparation of IR observations with 8m class telescopes;
- observations of (distant) galaxies with the VLT and the LBT telescopes.

2006 **Center for Astrophysics and Space Science (CASS), University of California San Diego (UCSD)**, in the Group of Dr. C. Lonsdale and Prof. H. Smith, working on the *Spitzer Wide-area Infrared Extragalactic Survey*.

- analysis of infrared (3-24 μm) images from the

Spitzer Satellite; source extraction and characterization;
- SED fitting with custom codes;
- statistical analysis of large samples of galaxies;
- reduction and analysis of optical spectra of galaxies;
- preparation of spectroscopic observations of galaxies with large telescopes (5-10m class);
- observations (optical and near-infrared spectroscopy) of distant galaxies with the Palomar/COSMIC and the Keck/LRIS telescopes/instruments).

2002 – 2007 **Padova Astronomy Department and Astronomical Observatory**, in the Group of Prof. A. Franceschini, *studying the properties of infrared galaxies near and far.*

- Reduction of optical and near-infrared spectroscopic data of local and distant star forming galaxies, both single-slit and multi-slit;
- Reduction of optical imaging data, including wide field mosaics obtained with different instruments;
- source extraction from reduced images and creation of catalogs;
- use of software to model the spectral energy distributions (SEDs) and the spectra of galaxies to derive photometric redshifts, stellar masses, star formation rates and other physical parameters, using different approaches (e.g. stellar population synthesis or template models; Bayesian or Adaptive Simulated Annealing algorithms);
- using statistical methods to study the completeness of samples and compute the volume density of their physical parameters;
- development of algorithms and custom codes to perform SED fitting and statistical analyses;
- preparation of spectroscopic observations of galaxies with large telescopes (4-8m class);
- observations (optical and near-infrared spectroscopy and imaging) of distant galaxies with the NTT and VLT telescopes.