Personal Informations

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Birth date	27th July 1983 Rome - Italy

Professional Experience

Actual Position

02/2012 – today
Postdoctoral Fellow – Deutsches Elektronen-Synchrotron (DESY) in Hamburg (Germany)

Activities

I have a postdoctoral fellowship at Deutsches Elektronen-Synchrotron (DESY) in Hamburg (Germany) and I am part of the Coherence Scattering Group and the staff of Coherence Applications beamline (P10) at PETRAIII. I study multiscale spatio-temporal complexity in strong correlated systems in particular High-Temperature superconductors (HTS). Using coherent X-rays and fast pulses, today available at the new generation Synchrotron Facilities and at the Free Electron Lasers (FEL) sources, it is possible to investigate the dynamic behavior of complex materials at unprecedented spatial and temporal resolution. I am specializing on X-ray Photon Correlation Spectroscopy (XPCS) and pump-probe experiments to study dynamics from seconds to femtoseconds scale. To study the problem of spatial complexity and inhomogeneity in HTS I applied, for the first time, the technique of scanning nano X-ray diffraction (nXRD) to directly visualize nanoscale phase separation in this class of functional materials. To do that we established a very strong and successful collaboration with the ID13 beamline at ESRF that can provide a record beam-size smaller than 100 nm.
In the last 2 years, thanks to that collaboration we have been able to publish several papers on top journals like Nature, PNAS and Physical Review. Indeed using scanning nXRD it is possible to map and control the **structural and magnetic heterogeneity in inhomogeneous high-temperature superconductors**, at nanoscale.
In particular, in the second half of 2011, we found nanoscopic phase separation in $K_{0.8}Fe_{1.6}Se_2$, a compound belongs to the last discovered HTS family.
During these years I focused my studies on experimental and analytical methods based on X-ray diffraction techniques. I am an expert of Scanning nano X-ray diffraction, X-ray single-crystal diffraction, X-ray powder diffraction; plus, I performed EXAFS, SAXS, WAXS, GISAXS, Multiharmonic Susceptivity measurements (FC and ZFC), circular dichroism and IR spectroscopy.

I'm proposer of **about 30 approved experimental projects** in international facilities like **LCLS** (USA), **ALS** (USA), **FERMI** (ITA), **PETRAIII** (GER), **ESRF** (FR), **SOLEIL** (FR), **DIAMOND** (UK), **PSI** (ZH), **LNF** (ITA) and **ELETTRA** (ITA).

Short biography

In December 2005 I got the Bachelor degree in Physics (110/110 cum laude) at Sapienza University of Rome with a thesis on complexity of biomaterials.
In July 2008 I obtained the Master degree in Physics (110/110 cum laude) at Sapienza University, working on magnesium-diborides and the new discovered iron-based superconductors getting specialized on complex materials. During this period I approached the Synchrotron radiation submitting and participating to several projects at large facilities in Europe.
In December 2011 I got the PhD in Material Science (evaluation was Excellent) at Sapienza University of Rome with a thesis on "STRUCTURAL TRANSITION AND PHASE SEPARATION STUDIES FOR SUPERCONDUCTING MATERIAL DESIGNING". In the years of PhD studied strong correlated systems and complex materials, developing a quite extended International collaboration network, that allowed me to publish almost 30 papers with an h-factor of 12 and more than 500 citations.
Between January 2011 and January 2012 I was associated researcher at the Institute of crystallography (CNR), developing Software for analysis of space/time resolved nano X-ray diffraction (nXRD) to study critical phenomena in HTS.
Form February 2012 I am Postdoctoral Fellow at Deutsches Elektronen-Synchrotron (DESY) in Hamburg.

Collaborations and journals activity

I have active collaborations with the following institutions and research groups:

- ESRF, Grenoble Cedex, **France**
- Stanford LCLS**, USA**
- Ames Laboratory, **USA**
- ETH Zurich, **Switzerland**
- University College London, **UK**
- Chinese Academy of Sciences, Beijing, **People's Republic of China**
- University of Science and Technology of China, Hefei, **People's Republic of China**
- National Institute for Materials Science, Tsukuba, **Japan**
- Elettra Synchrotron Center (ELETTRA), Trieste, **Italy**
- DESY, Hamburg, **Germany**
- Paul Scherrer Institute (PSI), Villigen, **Switzerland**

I collaborate with the following journals:

- As referee: journal of superconductivity and novel magnetism (from 01/2010)
  Superconductor Science and Technology (from 10/2012)
- In the editorial board: The Scientific World Journal (from 04/2012)

Conferences Organization

I was in the Organization Committee of the following International Conferences:

1. SUPERSTRIPES 2012 *"Phase separation and superstripes in high temperature superconductors and related materials"* at Ettore Majorana Center , Erice, Sicily – Italy (11 – 17 July) 2012
2. STRIPES2011 *"Quantum Phenomena in Complex Matter"* at Sapienza University - Dip. of Physics, Roma, Italia (9 – 15 July) 2011
3. SUPERSTRIPES2010 *"Quantum Phenomena in Complex Matter"* Ettore Majorana Center , Erice, Sicily – Italy (19-25 July) 2010
4. SUPERSTRIPES08 *"FeAs High Tc Superconducting Multilayers and Related Phenomena"* Aula Magna, Università La Sapienza, Roma – Italy (9-13 December) 2008
5. STRIPES08 *"Quantum Phenomena in Complex Matter*" Ettore Majorana Center , Erice, Sicily – Italy (25 July –01 August) 2008
6. COMEPHS "*Controlling mesoscopic phase separation in complex materials"* at Sapienza University - Dip. of Physics, Roma, Italia (9 – 11 April) 2008

Education

Additional Courses & Schools:

- "Dynamic pathways in Multidimensional Landscapes" Univ. of Potsdam, Germany (5 – 10 August) 2012
- NECSI 2011 *"New England Complex Systems Institute Course"* MIT, Boston - USA (June 13 – 24) 2011
  Complex Physical, Biological and Social Systems
  Computer Programming and Complex Systems
  Complex Systems Modeling and Networks
- Stochastic processes and Critical Phenomena – Mathematics Dep. - "Sapienza" University of Rome - 2011
- Physics of Complex Systems – Physics Dep. - "Sapienza" University of Rome - 2011
- SILS 2009 *"X School on Synchrotron Radiation: Fundamentals, Methods and Applications"* Duino Castle, Trieste – Italy (7-18 September) 2009
- AIC 2009 *"AIC International School, Scattering Techniques: From Microscopic To Atomic Structures"* Camerino, (30 August - 4 September) 2009
- XMNP 2009 "*Second School & Workshop on X-Ray Micro and nanoprobes"* Palinuro, Salerno – Italy (14-22 June) 2009

International Conferences and Workshops:

1. "Dynamic pathways in Multidimensional Landscapes - Kick off workshop" Universtity of Potsdam, Potsdam - Germany (5 – 10 August) 2012
2. ICCS 2011 "Eighth International Conference on Complex Systems" New England Complex Systems Institute, Boston, Quincy, MA - USA (June 26 - July 1) 2011

	10/2008 – 10/2011
Qualification	**phD in Physics**
Skills	Title of Thesis: Structural transition and phase separation studies for superconducting material designing Inhomogeneus HTcS, Magnetic materials, Complex materials, Critical Phenomena, Structural phase transitions, Scaling laws, O-O programming, Quantitative Analysis Physics Dep. – Sapienza University of Rome

	01/2006 – 07/2008
Qualification	**Master degree in Physics – 110/110 cum laude**
Skills	Title of Thesis: Competition between disorder and phase separation in Al-MgB_2 systems that boosts the quantum coherence Superconductivity, Physics of complex materials, Statistical Physics Physics Dep. – Sapienza University of Rome

	10/2002 – 12/2005
Qualification	**Bachelor degree in Physics – 110/110 cum laude**
Skills	Title of thesis: DNA folding and curvature scenario of proteins Physics, Mathematics, Scientific Programming, Mathematical Analysis and Statistics Physics Dep. – Sapienza University of Rome

Languages Spoken

Native Italian

Other Languages *	Understanding				Spoken				Written	
	Listen		Reading		Oral Interaction		Oral production			
English	B1	Good	B1	Very Good	B1	Good	B2	Good	B1	Good
Spanish	B1	Good	B1	Good	A2	Base	A1	Base	A1	Base

(*) European references for Languages

5 selected Publications

1. A. Ricci, N. Poccia, G. Campi, B. Joseph, G. Arrighetti, L. Barba, M. Reynolds, M. Burghammer, H. Takeya, Y. Mizuguchi, Y. Takano, M. Colapietro, N. L. Saini, A. Bianconi, *"Nanoscale phase separation in the iron chalcogenide superconductor $K_{0.8}Fe_{1.6}Se_2$ as seen via scanning nanofocused x-ray diffraction"* Physical Review B 84, 060511+ (2011), URL http://dx.doi.org/10.1103/PhysRevB.84.060511

2. A. Ricci, N. Poccia, B. Joseph, G. Arrighetti, L. Barba, J. Plaisier, G. Campi, Y. Mizuguchi, H. Takeya, Y. Takano, N. L. Saini and A. Bianconi, "*Intrinsic phase separation in superconducting $K_{0.8}Fe_{1.6}Se_2$ (Tc=31.8K) single crystals"* Superconductor Science and Technology 24, 082002+ (2011), URL http://iopscience.iop.org/0953-2048/24/8/082002/

3. N. Poccia, A. Ricci, G. Campi, M. Fratini, A. Puri, D. Di Gioacchino, A. Marcelli, M. Reynolds, M. Burghammer, N. L. Saini, et al., *"Optimum inhomogeneity of local lattice distortions in La_2CuO_{4+y}"* Proceedings of the National Academy of Sciences 109, 15685 (2012), ISSN 1091-6490, URL http://dx.doi.org/10.1073/pnas.1208492109.

4. M. Fratini, N. Poccia, A. Ricci, G. Campi, M. Burghammer, G. Aeppli, and A. Bianconi, *"Scale-free structural organization of oxygen interstitials in La_2CuO_{4+y}"* Nature 466, 841 (2010), ISSN 0028-0836, URL http://dx.doi.org/10.1038/nature09260

5. N. Poccia, M. Fratini, A. Ricci, G. Campi, L. Barba, A. Vittorini-Orgeas, G. Bianconi, G. Aeppli, and A. Bianconi, "*Evolution and control of oxygen order in a cuprateÂ superconductor*" Nature Materials, 10, 733-736 (2011), ISSN 1476-1122, URL http://dx.doi.org/10.1038/nmat3088

Talks in International Conferences (8 invited)

1. **title of talk:** *"nanoscale phase separation in iron-chalcogenides by scanning nano x-ray diffraction"* SUPERSTRIPES 2012 *"Phase separation and superstripes in high temperature superconductors and related materials"* at Ettore Majorana Center, Erice, Sicily – Italy (11 – 17 July) 2012
2. **title of talk:** *"Structure and dynamic of complex materials by Micro-diffraction and XPCS* ITSR2011 *"PhotoTech 2012"* at Bucharest - Romania (9-12 May) 2012
3. **title of talk:** *"Imaging of nanoscale phase separation in K0. 8Fe1. 6Se2 from scanning nanofocused x-ray diffraction "* ITSR2011 *"4th International Workshop on Imaging Techniques with Synchrotron Radiation"* at Bordeaux - France (24-27 September) 2011
4. **title of talk:** *"First direct observation of nanoscale phase separation in KFeSe systems"* STRIPES2011 *"Quantum Phenomena in Complex Matter"* at Sapienza University - Dip. of Physics, Roma, Italia (9 – 15 July) 2011
5. **title of talk:** *"Imaging structural heterogeneity in inhomogeneus high-temperature superconductors at nanoscale"* ITSR2010 *"3rd International Workshop on Imaging Techniques with Synchrotron Radiation"* at Suzhou, Jiangsu province, Shanghai – China (6-10 November) 2010
6. **title of talk:** "*Sharp versus Continuous First Order Structural Phase Transition and Role of Misfit Strain in RFeAsO (R=La,Pr,Nd and Sm)*" SUPERSTRIPES2010 *"Quantum Phenomena in Complex Matter"* Ettore Majorana Center , Erice, Sicily – Italy (19-25 July) 2010
7. **title of talk:** *"the 3D phase diagram in multilayered high-Tc superconductors"* at International meeting LPF09 *"Local distortions and Physics of Functional materials"* Laboratori Nazionali di Frascati, Roma - Italy (22-24 July) 2009
8. **title of talk:** "*mifit strain role in ReOFeAs superconductors*" Congresso internazionale SUPERSTRIPES08 "FeAs High Tc Superconducting Multilayers and Related Phenomena" Aula Magna, Sapienza University, Roma – Italy (9-13 December) 2008