UGO FANO PRIZE 2016

Aula Marconi, CNR Rome
December 19-21, 2016

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JOHN PENDRY
UGO FANO GOLD MEDAL

UGO FANO SYMPOSIUM

on Quantum Matter, Light Science, Complex systems, Materials and Life Science

Chairmen: **Antonio Bianconi, Augusto Marcelli, Andrea Perali**

Organizing Committee: **Bernardo Barbiellini-Amidei, Antonio Bianconi, Augusto Marcelli, Andrey Miroshnichenko, Andrea Perali**

RICMaSS Superstripes INFN Istituto Nazionale di Fisica Nucleare Laboratori Nazionali di Frascati CNR HYPATIA

UNICAM Università di Camerino REGIONE LAZIO epl A Letters Journal Exploring the Frontiers of Physics

Monday 19 December 2016

08.30-09.00 **Registration**

09.00-09:40 **Opening:** Massimo Inguscio (Presidente CNR), Pierluigi Campana (INFN-LNF), Salvatore Iannotta (IMEN, Parma), Paolo Mataloni (Dipartimento di Fisica, Sapienza), Lorenzo Lo Cascio (Regione Lazio)

09:45:10:15 ***The legacy of Ugo Fano and Ugo Fano Gold Medal 2016.*** **Antonio Bianconi** – RICMASS, Rome, **Giorgio Benedek** – Bicocca Univ. Milano

10:15 **PREMIO UGO FANO 2016**

10:30-11:15 **John Pendry** – The Blackett Laboratory, Imperial College, London, UK
Transformation optics, surface plasmons, and metasurfaces.

11:15-11:45 Coffee break

11:45-12:15 **Michele Parrinello** – ETH Zurich & Università della Svizzera Italiana, Lugano, CH
Fluctuations and rare events.

12:15-12:45 **PREMIO UGO FANO PER I GIOVANI**

12:45-14:30 Lunch

FANO RESONANCES

14.30-15.00 **Massimo Inguscio** – Florence University, president of CNR
Fano-Feschbach resonance in physics of ultracold fermions.

15.00-15.30 **Andrey Miroshnichenko** – Australian National University, Acton, Australia
Observation of anapole with dielectric nanoparticles.

15.30-16.00 **Bernardo Barbiellini-Amidei** – Department of Physics, Northeastern University, Boston
Computational schemes for optical response of hybrid systems composed of molecules, quantum dots and metallic nanoparticles.

16:00-16:20 Coffee break

16:20-16:50 **Carlos Sa de Melo** – Georgia Institute of Technology Atlanta, GA, USA
Uncloaking topological phases in the Berezinskii-Kosterlitz-Thouless transition of Fermi superfluids: An interplay of spin-orbit coupling, Rabi fields and interactions

16:50-17:20 **Giancarlo Strinati** – Università di Camerino, Camerino, Italy
BCS-BEC crossover in ultra-cold fermionic gases

17:20-17:50 **Andrea Perali** – Università di Camerino, Camerino, Italy
Multigap superconductivity, shape and barrier driven resonances in superconducting nanofilms with an inner potential barrier

17:50-18:20 **Igor Dremin** – Lebedev Physics Institute, Moscow, Russia
Fano resonances and Cherenkov gluons in ultra-relativistic nuclear collisions

Tuesday 20 December 2016

COMPLEXITY, CORRELATIONS, GEOMETRIES IN FUNCTIONAL DISORDERED MATTER

09:00-09:30 **Giorgio Parisi** – Sapienza University of Rome, Rome Italy
The physics of jamming: a journey from marble pebbles toward scaling invariant field theory

09:30-10:00 **Fabio Marchesoni** – University of Camerino & Tongji University, China
Brownian Motors: Spontaneous Pumping of Fluxons and Active Swimmers

10:00-10:30 **Jan Zaanen** – Leiden University
Holographic duality, strange metals and entanglement

10:30-11:00 **Igor I. Smolyaninov** – University of Maryland, College Park, MD, USA
Hyperbolic Metamaterials

11:00-11:30 Coffee Break and **Poster Session**

SUPERCONDUCTIVITY AT VERY HIGH TEMPERATURE

11.30-12.00 **Mikhail I. Eremets** – Max-Planck-Institut für Chemie, Mainz- Germany
High temperature conventional superconductivity

12.00-12.30 **Tian Cui** – Jilin University, Changchun, P. R. China
Hydrogen-rich materials under high pressure: clue and route to room temperature superconductivity

12:30-13:00 **Annette Bussmann-Holder** – Max-Planck-Institute for Solid State Research, Stuttgart, Germany
Multiband Superconductivity at extremely high temperatures: the case of pressurized sulfur hydrides

13:00-13:30 **Antonio Bianconi** – RICMASS, Rome, Italy & Institute of crystallography, CNR, Italy
Pressure driven Multi-condensates superconductivity at Lifshitz transitions in a complex spatial landscape with hyperbolic geometry

13:30-14:30 Lunch

NEW FUNCTIONAL MATERIALS AT HIGH PRESSURE

14:30-15:00 **Artem Oganov** – Skolkovo Institute of Science and Technology, Moscow Russia; Stony Brook University, NY
Novel high-pressure phenomena discovered through crystal structure prediction

15:00-15:20 **Defang Duan** – Jilin University, Changchun, P. R. China
Pressure-induced novel structure and properties of halogen hydrides

15:20-15:40 **Xiaoli Huang** – Jilin University, Changchun, P. R. China
The hydrogen bond role of hydrogen-rich compounds under high pressure

15:40-16:00 **Boby Joseph** – Elettra SincrotroneTrieste & ICTP
Pressure induced electronic topological transition: some case studies on the role of lattice degrees of freedom

16:00-16:40 Coffee Break and **Poster Session**

CHARGE AND SPIN ORGANIZATION IN QUANTUM MATTER

16:40-17:00 **Jurgen Haase** – University of Leipzig, Leipzig, Germany
Multiple Electronic Components in Cuprate High-Temperature Superconductors from NMR High-

17:00-17:20 **Marco Grilli** – Sapienza Università Roma, Rome, Italy
Intrinsic inhomogeneities in two-dimensional superconductors

17:20-17:40 **Jose Lorenzana** – ICS - CNR and Sapienza, University Rome, Italy
The soft side of hard matter

17:40-18:00 **Roberto Raimondi** – Università Roma Tre, Rome, Italy
Spin Hall Effect by Phonon Skew Scattering

19:30 ***Social Dinner***

Wednesday 21 December 2016

COMPLEX SYSTEMS AND NANOSTRUCTURES

09:00-09:30 **Francesco Mauri** – Sapienza University of Rome, Italy
Charge density waves and phonons in bulk and monolayer of NbSe2 and NbS2

09:30-10:00 **Stefano Lupi** – Sapienza University of Rome, Rome Italy
Fano effect in exotic plasmonic materials: The case of Topological Insulators and High-Tc Superconductors

10:00-10:30 **Fabio Sciarrino** – Sapienza University of Rome, Rome Italy
Boson sampling with integrated quantum photonics

10:30-11:00 Coffee Break

11:00-11.30 **Alessandra Lanzara** – Berkeley University of California, USA
Non-equilibrium quantum materials

11:30-12:00 **Augusto Marcelli** – LNF- INF, Frascati Italy
Nanoscale phase separation and lattice complexity in VO2, a complex multi-phase correlated electron systems

12:00-12:20 **Marco Cariglia** – Università di Camerino, Camerino, Italy
Curvatronics with bilayer graphene in an effective 4 spacetime

12:20-12:40 **Marcus Bendele** – RICMASS Rome, Italy
Evidence for strong lattice effects as revealed from huge unconventional oxygen isotope effects on the pseudogap temperature in $La_{2-x}Sr_xCuO_4$

12:40-13:00 **Gaetano Campi** – IC-CNR Montelibretti Roma IT
Complexity in heterogeneous functional materials as seen by synchrotron x-ray (sub)micron beam techniques

13:00-13:20 **Antonio Cricenti** – ISM CNR Rome, Italy
Early cancer diagnostics by IR-SNOM spectroscopy

13:00-13:30 **Closing session and Awards for best posters**

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Rome (IT) Dec. 19-21, 2016

CNR Piazzale Aldo Moro 7, Aula Marconi 00185 Roma IT

POSTER Session

Wei Xu, et al. – Institute of High Energy Physics (IHEP), Chinese Academy of Sciences in Beijing
X-ray Magnetic Circular Dichroism spectroscopy at Cu K-edge and L-edge of Bi2212 superconductors

Sara Conti, et al. – University of Camerino, Camerino IT & Antwerp University (Belgium)
BEC-BCS crossover in a multiband double bilayer graphene

Luca Flammia, et al. – University of Camerino and Antwerp University (Belgium)
Quantum-size effects in superconducting nanostripes with step-edge

Alfredo A. Vargas-Paredes – University of Camerino IT and Antwerp University (Belgium)
Crosspairing Effects in a Two Band Superconductor

Davide Grassano, Friedhelm Bechstedt, Olivia Pulci – Tor Vergata University Rome IT
Electronic and optical properties of Weyl semimetals based on transition metal monopnictides: Ab initio studies of TaAs, TaP, NbAs and NbP

Elena Missale, et al. – Tor Vergata University Roma & LNF INFN, Frascati IT
Lipid content variation in yeasts detected by FTIR spectroscopy

M. Silvia Prete, A.Mosca Conte, Paola Gori, F. Bechstedt , O.Pulci – Tor Vergata University Rome IT
Two Dimensional Nitrides: an ab-initio study

S. Macis, M. Lucci, I. Davoli – Tor Vergata University Roma, Italy
Hybrid CIGS: TiO2 thin film solar cells by sol gel method

L. Avaldi, P. Bolognesi, M. Coreno, D. Catone, P.O'Keeffe, S. Turchini, N.Zema, M. Alagia, A. D'Elia, A.Morgante, M. de Simone, C. Callegari, C. Grazioli, K. Prince, R. Richter – Elettra Sincrotrone, Trieste
MOST: MOlecular Science and Technology. A new XUV beamline at Elettra, Trieste