Italian National Committee

2022 Italian URSI Annual Meeting

The annual Meeting of the Italian URSI Committee will be held on **September 20-21, 2022** jointly with the XXIV Riunione Nazionale di Elettromagnetismo (Italian National Meeting on Electromagnetics – RiNEm) (http://rinem2022.unict.it/)

Venue: The conference is jointly organized at the "Complesso Edilizio Le Verginelle" (Dipartimento di Scienze della Formazione, DISFOR, University of Catania, entrance from Via Casa Nutrizione) and at the "Monastero dei Benedettini di San Nicolò l'Arena" (Dipartimento di Scienze Umanistiche, DISUM, University of Catania), Piazza Dante Alighieri 32, 95124 Catania.
Date: Tuesday 20 and Wednesday 21, September 2022
Organizers: Carlo Carobbi (University of Florence), Giuliano Manara (University of Pisa)

PROGRAMME

The URSI Italian National Meeting is intended to disseminate and promote the activities of the International Radio Science Union, one of the oldest and largest scientific Unions supporting education and research in all Radio Science fields (www.ursi.org). The meeting offers an URSI Special Session with tutorials exemplifying the activities of three URSI Scientific Commissions, and the presentations of the three finalist papers of the 2022 Best Paper Young Scientist Award delivered by the URSI Italian National Committee and named after Prof. Roberto Sorrentino.

Tuesday, September 20

"Roberto Sorrentino" Award Session

Session Chair: Giuliano Manara, Secretary URSI Italy

12:00-12:15
Carlo Carobbi – President URSI Italy
"*The International Union of Radio Science (URSI) and its Italian and International Activities*"

12:15-13:15
Presentations of the three finalist papers (15 minutes plus 5 minutes questions each)

12:15-12:35
Matteo Bruno Lodi, Nicola Curreli, Sonia Zappia, Ilaria Catapano, Lorenzo Crocco, Alessandro Fanti, Giuseppe Mazzarella
"Effects of Magnetic Scaffolds Geometry and Magnetic Nanoparticles Distributions on their Specific Absorption Rate and Hyperthermic Potential"

12:35-12:55
M. Longhi, S. Vellucci, M. Barbuto, A. Monti, F. Bilotti, A. Toscano
"Huygens Cylindrical Metasurfaces for Reconfigurable Antennas"

12:55-13:15
Rayan Imam, Lucilla Alfonsi, Claudio Cesaroni, Luca Spogli and Fabio Dovis
"Detecting high latitude phase scintillation from IGS RINEX observation files and machine learning"

20:00 Social Dinner and Joint URSI-SIEm Award Ceremony

the programme continues in the next page

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Wednesday, September 21
URSI Special Session
Session Chair: Carlo Carobbi, President URSI Italy

9:00-9:15
Giuliano Manara – Secretary URSI Italy
"URSI International Activities in 2023: EMTS and URSI GASS conferences"

9:15-9:45
Micaela Liberti
Commission K: Electromagnetics in Biology and Medicine
"Bioelectromagnetic research based on lessons learned, reliable techniques and microscopic models: the challenge of new emerging technologies"

9:45-10:15
Simonetta Paloscia, Paolo Pampaloni, and Emanuele Santi
Commission F: Wave Propagation and Remote Sensing (planetary atmospheres, surfaces and subsurfaces)
"Microwave remote sensing of natural surfaces: experimental and modeling results"

10:15-10:45
Grazia Umana
Commission J: Radio Astronomy
"The Impact of SKA on Galactic Science: a glimpse at the Galactic plane with SKA precursors"

10:45 Coffee break

end of the programme

SUMMARIES OF THE URSI SPECIAL SESSION PRESENTATIONS

Bioelectromagnetic research based on lessons learned, reliable techniques and microscopic models: the challenge of new emerging technologies

Micaela Liberti
Università di Roma "La Sapienza"

Abstract: Much research in recent decades has investigated exposure to radiofrequency electromagnetic fields (RF-EMF) in the general population and in the occupational environment, in order to assess its potential effects on health. Up to now no detrimental effect has been demonstrated for the low levels commonly used in telecommunications; nonetheless some suggestions came from multidisciplinary and interdisciplinary epidemiological and biological experimental studies. The growth of digital technologies and electronic communication services implies a continuous increase of number and type of RF-EMF sources. Thus, the introduction of new emerging technologies such as 5G, increases the need of research on the potential risks that this exposure may pose to human health before the widespread use in practical daily life. Such research requires the development of novel tools to monitor the evolution of exposure levels and patterns in different populations, and following an integrative approach to the identification of potential causal biological effects through innovative experimental technique and advanced modeling at the microscopic and molecular scale.

Microwave remote sensing of natural surfaces: experimental and modeling results

Simonetta Paloscia, Paolo Pampaloni, and Emanuele Santi
Institute of Applied Physics 'Nello Carrara' (IFAC), National Research Council (CNR)

Abstract: Since the early 1980s, the capabilities of satellite sensors operating at microwaves for the remote sensing of Earth's surface have been widely assessed in a number of studies. Due to the high sensitivity of microwave emission and scattering to water content in the observed surfaces, microwave sensors, both active (scatterometers, SAR) and passive (radiometers), provide useful information on the hydrological and carbon cycles, enabling the retrieval of the main soil, snow and vegetation parameters. The research demonstrated that a significant accuracy improvement in estimating the main land parameters of the hydrological cycle, such as soil moisture content, vegetation biomass, and snow depth or snow water equivalent, can be obtained by combining data collected at different frequencies and polarizations, with respect to the one achievable with single frequency/polarization observations. The research conducted at IFAC pointed out that given combinations of data acquired by microwave satellite sensors such as AMSR-E/AMSR2, SMAP, Sentinel-1, ALOS, COSMO-SkyMed can be successfully related to snow and vegetation parameters. The use of adequate e.m. models and, successively, of specific algorithms based on machine learning approaches allowed simulating microwave emission and backscattering at different frequencies and the estimate of the above-mentioned parameters with very high accuracy.

The Impact of SKA on Galactic Science: a glimpse at the Galactic plane with SKA precursors

Grazia Umana
Istituto Nazionale di Astrofisica (INAF), Osservatorio Astrofisico di Catania (OACt)

Abstract: The Square Kilometre Array (SKA) project is an international effort to build the world's largest radio telescope, with eventually over a square kilometre of collecting area. The scale of the SKA represents a huge leap forwards in both engineering, research and development towards building and delivering a unique instrument, with the construction phase now well under way. About 50-70% of the first five years of SKA operations will be devoted to Key Science Projects (KSPs), and probably also to Generic Surveys that maximize commensality to a wide range of scientific objectives. SKA, providing better sensitivity and angular resolution than any of ongoing/planned surveys of the Galactic plane, will give the opportunity to create a sensitive wide-field atlas of Galactic radio emission and to address several topics in the field of Galactic radioastronomy.
In this talk I will analyze the impact that the SKA will have on Galactic studies, starting from the immense legacy value of a SKA Galactic Plane survey, and present some areas of Galactic Science that particularly benefit from SKA observations. I will also summarize the ongoing work aimed at achieving skills and expertise in the run-up to the development of the full SKA to be ready and competitive for leading and participating to a SKA KSP focused on the Galactic Plane, with particular regards to recent results from the use of high-frequency SKA precursors.