



## WORK EXPERIENCE AND EDUCATION

Andrea Francesco Morabito received a Bachelor's Degree (with honors) in Telecommunications Engineering (2005), a Master's Degree (with honors) in Telecommunications Engineering (2007), and a Ph.D. Degree in Computer, Biomedical, and Telecommunications Engineering (2011) from the Mediterranea University of Reggio Calabria.

He has been an Assistant Professor at the Mediterranea University of Reggio Calabria from 2010 to 2022. In 2022, he was awarded the National Scientific Qualification for the Full Professor position, and he currently is an Associate Professor at the Mediterranea University of Reggio Calabria.

## RESEARCH ACTIVITY

Prof. Morabito's research work is focused on effective strategies for the solution of inverse problems in electromagnetics, including antenna synthesis, phase retrieval, inverse scattering, and theranostics problems with applications ranging from biomedical imaging and anti-cancer microwave hyperthermia to radar, 5G/6G, and satellite communications.

- ✓ According to the Scopus database, his H-index is equal to 30 and his papers received 1800 citations.
- ✓ He co-authored more than 120 scientific papers published in peer-reviewed journals and conference proceedings (the complete list of publications has been attached at the end of this document).
- ✓ In 2020, 2021, and 2022, he was ranked as one of the top 2% cited scientists in the world (ranking published on 4 October 2023 by Stanford University, DOI: 10.17632/btchxktzyw.6).
- ✓ He is one of the very few people who were awarded both the Barzilai Prize and the Latmiral Prize by the Italian Electromagnetics Society.
- ✓ In 2022, he was awarded the National Scientific Qualification for the Full Professor academic position.
- ✓ He is one of the three professors of the University of Reggio Calabria who ranked first in the National Evaluation of Research Quality performed from 2015 to 2019 by the Italian Ministry of Education, University, and Research.

The most relevant achieved research results are described in the following by referring to ten of the most significative Andrea Morabito's publications:

- **ANTENNA SYNTHESIS:** He contributed to the development of new approaches to pattern synthesis of realistic arrays [1], reconfigurable arrays for radar communications [2], isophoric sparse arrays with a reduced number of control points for satellite communications [3], continuous sources [4], and interferometers [5];
- **ANTENNA DIAGNOSIS:** He contributed to the development of innovative techniques for the diagnosis of the faulty elements of realistic arrays by exploiting only amplitude measurements of the radiated field [6];
- **INVERSE SCATTERING:** He contributed to the identification and optimization of the 'Degree Of Non Linearity' of the inverse electromagnetic scattering problem [7]. The results have been applied to breast cancer imaging and other biomedical challenges;
- **INVERSE DESIGN:** He contributed to the development of a new approach to the design of metamaterials-based antennas, where the shape of the antenna as well as its internal dielectric and conductive properties are identified in such a way as to generate a desired radiation pattern. This has been done by solving an inverse scattering problem where the scattered field is set as the desired one rather than as the measured one [8];
- **PHASE RETRIEVAL:** He contributed to the development of new approaches to phase retrieval exploiting only one measurement surface and avoiding the so-called 'false solutions' without resorting to global-optimization algorithms [9],[10].

## CURRICULUM VITAE

**Prof. Andrea Francesco Morabito**

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## SCIENTIFIC PROJECTS

Andrea Morabito is the coordinator for the University of Reggio Calabria of two Italian Ministry of University and Research 'PRIN' scientific research projects, i.e.:

1. the project entitled "CYBER-PHYSICAL ELECTROMAGNETIC VISION: Context-Aware Electromagnetic Sensing and Smart Reaction" (2020);
2. the project entitled "MEtasurface-based tEchnology Towards industrial APPLications (MEETAPP)" (2023).

Furthermore, Prof. Morabito has been officially involved in very many scientific projects concerning telecommunication and biomedical applications of electromagnetic fields, for which he regularly provided innovative approaches and algorithms for the optimal solution of the scientific problem at hand. The most important projects are as follows:

- n° 3 projects funded by the European Space Agency, respectively entitled 'Innovative architectures for reducing the number of controls of multiple beam telecommunications antennas' (2009), 'Optimization of Array Element Positions in the GEO Atmospheric Sounder' (2009), and 'Active Multibeam Sparse Array Demonstrator' (2011);
- n°1 project funded by the European Defence Agency, entitled 'Radar Implementation of Compressive Sensing' (2012);
- more than 10 projects funded by the Italian Ministry of Education, University, and Research (every year from 2011 to 2024) concerning research and experimental activities on electromagnetic fields.

Prof. Morabito has carried out project activities also in collaboration with:

- Space Engineering (an Italian space company, part of Airbus Defence, providing innovative solutions for Telecom & Earth observation) from 2009 to 2011;
- MBDA (a European multinational developer and manufacturer of missiles) from 2018 to 2020;
- Thales Alenia Space (a French multinational company that designs and manufactures electrical systems as well as devices and equipment for the aerospace, defense, transportation, and security sectors) from 2019 to 2021.

## ORGANIZATION, DIRECTION, AND COORDINATION OF SCIENTIFIC EDITORIAL ACTIVITIES

Prof. Morabito is an Associate Editor of several scientific international journals, including the Elsevier AEU International Journal of Electronics and Communications, the Elsevier Heliyon Journal, the IET Journal of Engineering, the MDPI Journal of Imaging, and the Hindawi International Journal of Antennas and Propagation. He also serves as a board member of the quarterly newsletter of the IEEE AP/ED/MTT North Italy and has been the organizer and chairman of several Scientific Sessions in different International Conferences, including the Progress In Electromagnetics Research Symposium and the European Conference on Antennas and Propagation.

Prof. Morabito is an Senior Member of IEEE and also a member of the European Association on Antennas and Propagation, the IEEE AP/ED/MTT North Italy Chapter, and the Italian Electromagnetics Society. He has been working as a Reviewer for about 50 scientific journals and received from the IEEE Antennas and Propagation Society a Certificate in recognition and appreciation for exceptional performance from May 1st, 2018 to April 30th, 2019 as a Reviewer of the IEEE Transactions on Antennas and Propagation.

## TEACHING ACTIVITY AND ACADEMIC/INSTITUTIONAL APPOINTMENTS

Every year since 2010, Andrea Morabito has been teaching several Academic Courses (including "Electromagnetism: Fundamentals", "Radio Propagation in Complex Environments", and "High-Performance Antennas Design") at the University of Reggio Calabria. He has been the advisor of more than 50 graduation theses at the same University. He regularly serves as a teacher in the European School of Antennas and

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Propagation (ESoA), a post-graduate school of Electromagnetic Engineering distributed in several research centers in Europe.

Prof. Morabito is currently the Delegate for Research of the Department of Information Engineering, Infrastructures, and Sustainable Energy of the University of Reggio Calabria, and a member of both the Quality Presidium and the Academic and Research-based Orientation Committees.

Every year since 2011, he served as a member of selection boards for Ph.D. and other academic positions in several Italian universities.

**References (ten of the most significant papers co-authored by Andrea Morabito):**

- [1] "Extending Spectral Factorization to Array Pattern Synthesis Including Sparseness, Mutual Coupling, and Mounting-Platform Effects", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2019), DOI: 10.1109/TAP.2019.2905977
- [2] "Optimal Synthesis of Reconfigurable Planar Arrays With Simplified Architectures for Monopulse Radar Applications", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2014), DOI: 10.1109/TAP.2014.2386359
- [3] "An Effective Deterministic Procedure for the Synthesis of Shaped Beams by means of Uniform-Amplitude Linear Sparse Arrays", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2012), DOI: 10.1109/TAP.2012.2219844
- [4] "Optimal Synthesis of Circularly Symmetric Shaped Beams", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2014), DOI: 10.1109/TAP.2014.2302842
- [5] "Optimization of the Array Element Layout for a Rotating Imaging Interferometer", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2013), DOI: 10.1109/TAP.2013.2271233
- [6] "Fault Diagnostics of Realistic Arrays from a Reduced Number of Phaseless Near Field Measurements", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2023), DOI: 10.1109/TAP.2023.3293004
- [7] "On the Solution of 2-D Inverse Scattering Problems via Source-Type Integral Equations", IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING (2010), DOI: 10.1109/TGRS.2009.2032175
- [8] "Design of Artificial-Material-Based Antennas Using Inverse Scattering Techniques", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2018), DOI: 10.1109/TAP.2018.2871707
- [9] "Reflector Antennas Characterization and Diagnostics Using a Single Set of Far-Field Phaseless Data and Crosswords-Like Processing", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2022), DOI: 10.1109/TAP.2022.3168652
- [10] "Effective Non-Iterative Phase Retrieval of 2-D Bandlimited Signals With Applications to Antenna Characterization and Diagnostics", IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (2023), DOI: 10.1109/TAP.2023.3283044

**Andrea Francesco Morabito's Publications on Scientific Peer-Reviewed Journals (Source: Scopus, January 17th, 2024)**

- [1] Battaglia, G.M., Isernia, T., Palmeri, R., Morabito, A.F.  
Four-Beams-Reconfigurable Circular-Ring Array Antennas for Monopulse Radar Applications  
(2023) *Radio Science*, 58 (9), art. no. e2023RS007776.
- [2] Palmeri, R., Battaglia, G.M., Morabito, A.F., Costanzo, S., Venneri, F., Isernia, T.  
Fault Diagnosis of Realistic Arrays from a Reduced Number of Phaseless Near-Field Measurements  
(2023) *IEEE Transactions on Antennas and Propagation*, 71 (9), pp. 7206-7219.
- [3] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Effective Non-Iterative Phase Retrieval of 2-D Bandlimited Signals with Applications to Antenna Characterization and Diagnostics  
(2023) *IEEE Transactions on Antennas and Propagation*, 71 (8), pp. 6444-6453.
- [4] Battaglia, G.M., Isernia, T., Palmeri, R., Morabito, A.F.  
Synthesis of Orbital Angular Momentum Antennas for Target Localization  
(2023) *Radio Science*, 58 (2), art. no. e2022RS007592,
- [5] Palmeri, R., Battaglia, G.M., Morabito, A.F., Isernia, T.  
Reflector Antennas Characterization and Diagnostics Using a Single Set of Far-Field Phaseless Data and Crosswords-Like Processing  
(2022) *IEEE Transactions on Antennas and Propagation*, 70 (9), pp. 8424-8439.
- [6] Le Trong, P.B., Anselmi, N., Battaglia, G.M., Isernia, T., Rocca, P., Morabito, A.F.  
Synthesis of Wideband Reconfigurable Array Antennas for Monopulse Radar Applications  
(2021) *Progress In Electromagnetics Research M*, 106, pp. 179-189.
- [7] Battaglia, G.M., Palmeri, R., Morabito, A.F., Nicolaci, P.G., Isernia, T.  
A Non-Iterative Crosswords-Inspired Approach to the Recovery of 2-D Discrete Signals from Phaseless Fourier Transform Data  
(2021) *IEEE Open Journal of Antennas and Propagation*, 2, art. no. 9354859, pp. 269-280.
- [8] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Constrained focusing of vector fields intensity in near zone and/or complex scenarios as a low-dimensional global optimization  
(2020) *Journal of Electromagnetic Waves and Applications*, 34 (15), pp. 1977-1989.
- [9] Bui, L.T.P., Anselmi, N., Isernia, T., Rocca, P., Morabito, A.F.  
On bandwidth maximization of fixed-geometry arrays through convex programming  
(2020) *Journal of Electromagnetic Waves and Applications*, 34 (5), pp. 581-600.
- [10] Battaglia, G.M., Morabito, A.F., Sorbello, G., Isernia, T.  
Mask-constrained power synthesis of large and arbitrary arrays as a few-samples global optimization  
(2020) *Progress In Electromagnetics Research C*, 98, pp. 69-81.
- [11] Battaglia, G.M., Bellizzi, G.G., Morabito, A.F., Sorbello, G., Isernia, T.  
A general effective approach to the synthesis of shaped beams for arbitrary fixed-geometry arrays  
(2019) *Journal of Electromagnetic Waves and Applications*, 33 (18), pp. 2404-2422.
- [12] Palmeri, R., Bevacqua, M.T., Morabito, A.F., Isernia, T.  
Noncooperative Localization and Tracking through the Factorization Method

- (2019) IEEE Geoscience and Remote Sensing Letters, 16 (8), art. no. 8645656, pp. 1205-1209.
- [13] Morabito, A.F., Di Carlo, A., Di Donato, L., Isernia, T., Sorbello, G.  
Extending Spectral Factorization to Array Pattern Synthesis Including Sparseness, Mutual Coupling, and Mounting-Platform Effects  
(2019) IEEE Transactions on Antennas and Propagation, 67 (7), art. no. 8669825, pp. 4548-4559.
- [14] Palmeri, R., Isernia, T., Morabito, A.F.  
Diagnosis of Planar Arrays Through Phaseless Measurements and Sparsity Promotion  
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- [15] Di Donato, L., Morabito, A.F., Torrisi, G., Isernia, T., Sorbello, G.  
Electromagnetic Inverse Profiling for Plasma Diagnostics via Sparse Recovery Approaches  
(2019) IEEE Transactions on Plasma Science, 47 (4), art. no. 8668719, pp. 1781-1787.
- [16] Di Donato, L., Mascali, D., Morabito, A.F., Sorbello, G.  
A finite-difference approach for plasma microwave imaging profilometry  
(2019) Journal of Imaging, 5 (8), art. no. 70.
- [17] Morabito, A.F., Palmeri, R., Morabito, V.A., Laganà, A.R., Isernia, T.  
Single-surface phaseless characterization of antennas via hierarchically ordered optimizations  
(2019) IEEE Transactions on Antennas and Propagation, 67 (1), art. no. 2877270, pp. 461-474.
- [18] Palmeri, R., Bevacqua, M.T., Morabito, A.F., Isernia, T.  
Design of Artificial-Material-Based Antennas Using Inverse Scattering Techniques  
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Orbital angular momentum antennas: Understanding actual possibilities through the aperture antennas theory  
(2018) IEEE Antennas and Propagation Magazine, 60 (2), pp. 59-67.
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Circular-ring antenna arrays being at the same time sparse, isophoric, and phase-only reconfigurable: Optimal synthesis via continuous aperture sources  
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Synthesis of maximum-efficiency beam arrays via convex programming and compressive sensing  
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Optimal synthesis of shaped beams through concentric ring isophoric sparse arrays  
(2017) IEEE Antennas and Wireless Propagation Letters, 16, art. no. 7585017, pp. 979-982.
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Power synthesis of mask-constrained shaped beams through maximally-sparse planar arrays  
(2016) Telkommika (Telecommunication Computing Electronics and Control), 14 (4), pp. 1217-1219.
- [24] Laganà, A.R., Morabito, A.F., Isernia, T.  
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(2016) Radio Science, 51 (12), pp. 1855-1863.
- [25] Castorina, G., Di Donato, L., Morabito, A.F., Isernia, T., Sorbello, G.  
Analysis and Design of a Concrete Embedded Antenna for Wireless Monitoring Applications

- (2016) IEEE Antennas and Propagation Magazine, 58 (6), art. no. 7762866, pp. 76-93.
- [26] Mauro, G.S., Castorina, G., Morabito, A.F., Di Donato, L., Sorbello, G.  
Effects of lossy background and rebars on antennas embedded in concrete structures  
(2016) Microwave and Optical Technology Letters, 58 (11), pp. 2653-2656.
- [27] Isernia, T., Morabito, A.F.  
Mask-Constrained Power Synthesis of Linear Arrays with even Excitations  
(2016) IEEE Transactions on Antennas and Propagation, 64 (7), art. no. 7457359, pp. 3212-3217.
- [28] Morabito, A.F., Palmeri, R., Isernia, T.  
A Compressive-Sensing-Inspired Procedure for Array Antenna Diagnostics by a Small Number of Phaseless Measurements  
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Adaptive nulling through subarray switching in planar antenna arrays  
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- [30] Morabito, A.F., Laganà, A.R., Di Donato, L.  
Satellite multibeam coverage of earth: Innovative solutions and optimal synthesis of aperture fields  
(2016) Progress in Electromagnetics Research, 156, pp. 135-144.
- [31] Morabito, A.F., Laganà, A.R., Sorbello, G., Isernia, T.  
Mask-constrained power synthesis of maximally sparse linear arrays through a compressive-sensing-driven strategy  
(2015) Journal of Electromagnetic Waves and Applications, 29 (10), pp. 1384-1396.
- [32] Rocca, P., Morabito, A.F.  
Optimal synthesis of reconfigurable planar arrays with simplified architectures for monopulse radar applications  
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- [33] Morabito, A.F., Lagana, A.R., Isernia, T.  
Optimizing power transmission in given target areas in the presence of protection requirements  
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Compact single-layer circularly polarized antenna for short-range communication systems  
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- Isophoric array antennas with a low number of control points: A 'size tapered' solution  
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An effective deterministic procedure for the synthesis of shaped beams by means of uniform-amplitude linear sparse arrays  
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Tomographic imaging of holographic GPR data for non-invasive structural assessment: The Musmeci bridge investigation  
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An effective approach to the synthesis of phase-only reconfigurable linear arrays  
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Optimal synthesis of phase-only reconfigurable linear sparse arrays having uniform-amplitude excitations  
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Optimal synthesis of sum and difference patterns with arbitrary sidelobes subject to common excitations constraints  
(2010) IEEE Antennas and Wireless Propagation Letters, 9, art. no. 5492146, pp. 623-626.
- [44] Morabito, A.F., Isernia, T., D'Urso, M.  
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On the solution of 2-d inverse scattering problems via source-type integral equations  
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A simple processing approach for holographic RASCAN data  
(2010) Progress in Electromagnetics Research, 107, pp. 315-330.
- [47] Iero, D., Isernia, T., Morabito, A.F., Catapano, I., Crocco, L.  
Optimal constrained field focusing for hyperthermia cancer therapy: A feasibility assessment on realistic phantoms  
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On the optimal synthesis of ring symmetric shaped patterns by means of uniformly spaced planar arrays  
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A deterministic approach to the synthesis of pencil beams through planar thinned arrays  
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Optimal synthesis of directivity constrained pencil beams by means of circularly symmetric aperture fields  
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On quantitative microwave tomography of female breast  
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Direct radiating arrays for satellite communications via aperiodic tilings  
(2009) Progress in Electromagnetics Research, 93, pp. 107-124.

### **Andrea Francesco Morabito's Publications on International Scientific Conference Proceedings (Source: Scopus, January 17th, 2024)**

[53] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
A Third 'Crosswords Based' Approach to 2-D Phase Retrieval Problems  
(2023) 2023 IEEE USNC-URSI Radio Science Meeting (Joint with AP-S Symposium), AP-S/URSI 2023 - Proceedings, pp. 23-24.

[54] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Difference Patterns for Monopulse Radars Using Low-Sidelobe Vortex Beams  
(2023) 2023 IEEE USNC-URSI Radio Science Meeting (Joint with AP-S Symposium), AP-S/URSI 2023 - Proceedings, pp. 29-30.

[55] Battaglia, G.M., Isernia, T., Palmeri, R., Morabito, A.F.  
Improving Precision Pointing of Monopulse Radars by Exploiting OAM Vortex Beams  
(2023) 2023 Photonics and Electromagnetics Research Symposium, PIERS 2023 - Proceedings, pp. 943-945.

[56] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Solving Phase Retrieval Problems for Antenna Characterization and Diagnostics by Means of a Single Measurement Surface: Recent Developments and New Goals  
(2023) 2023 Photonics and Electromagnetics Research Symposium, PIERS 2023 - Proceedings, pp. 946-952.

[57] Crisafulli, O., Morabito, A.F., Pavone, S.C., Piazzese, N.I., Di Donato, L., Isernia, T., Sorbello, G.  
Compact Circularly Polarized Array for Direction Finding: Use of Conventional Steering Vector versus Embedded Radiation Patterns  
(2023) 17th European Conference on Antennas and Propagation, EuCAP 2023.

[58] Guarnera, D., Pavone, S.C., Di Donato, L., Morabito, A.F., Isernia, T., Sorbello, G.  
Design and optimization of Slotted Arrays by Power Synthesis Approach  
(2023) 17th European Conference on Antennas and Propagation, EuCAP 2023.

[59] Battaglia, G.M., Palmeri, R., Morabito, A.F., Isernia, T.  
Optimal Synthesis of Circular Ring Arrays for Targets Localization via Orbital Angular Momentum Vortex Beams  
(2022) 2022 3rd URSI Atlantic and Asia Pacific Radio Science Meeting, AT-AP-RASC 2022.

[60] Battaglia, G.M., Isernia, T., Morabito, A.F., Palmeri, R., Vitiello, R.  
Innovative Antenna Solutions for Satellite Telecommunications  
(2022) 2022 3rd URSI Atlantic and Asia Pacific Radio Science Meeting, AT-AP-RASC 2022.

[61] Palmeri, R., Battaglia, G.M., Morabito, A.F., Isernia, T.  
Array Antenna Fault Diagnosis Via Near Field Amplitude-Only Data  
(2022) 2022 16th European Conference on Antennas and Propagation, EuCAP 2022.

- [62] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Localizing Targets via Properly-Synthesized Orbital Angular Momentum Vortices  
(2022) 2022 16th European Conference on Antennas and Propagation, EuCAP 2022.
- [63] Palmeri, R., Battaglia, G.M., Morabito, A.F., Isernia, T.  
A New Approach to Phase Retrieval and its Application to Reflector Antennas Diagnostics  
(2021) 2021 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting, APS/URSI 2021 - Proceedings, pp. 261-262.
- [64] Palmeri, R., Battaglia, G.M., Morabito, A.F., Isernia, T.  
Phase Retrieval of 2-D Radiated Fields from Phaseless Data: A new Crossword Approach(2021) 2021 Antenna Measurement Techniques Association Symposium, AMTA 2021.
- [65] Battaglia, G.M.,Palmeri, R., Morabito, A.F., Isernia, T.  
A New X-Words like Approach to Two Dimensional Phase Retrieval Problems  
(2021) 15th European Conference on Antennas and Propagation, EuCAP 2021, art. no. 9410937.
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Retrieval and Synthesis of Sources having a Circular Support and Generating Shaped Patterns  
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- [67] Battaglia, G.M., Morabito, A.F., Palmeri, R., Isernia, T.  
Towards 3-D Vector Intensity Focusing of Near and Far Fields  
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