

CURRICULUM VITÆ

Matteo ALBANI

Office: Dip. Ingegneria dell'Informazione e Scienze Matematiche, Università di Siena

Via Roma 56, 53100 Siena, Italy.

tel. +39 0577 235882 - fax. +39 0577 233609

e-mail: matteo.albani(at)unisi.it

Education

He received the *Laurea* degree (*cum laude* and solemn encomium of the thesis committee) in *Electronics Engineering* in 1994 and the Ph.D. degree in *Information and Telecommunication Engineering* in 1999 from University of Florence (Firenze), Italy.

Professional Career

From 1999 to 2001 he was an Associate Researcher at the Information Engineering Dept., University of Siena, Siena Italy.

From 2001 to 2005, he joined the Dept. Of Matter Physics and Advanced Technologies, University of Messina, Messina Italy, as an Assistant Professor, teaching the "Electromagnetics" and "Telecommunications" courses at the Engineering Faculty.

Since 2005, he has been with the Information Engineering and Mathematics Dept., University of Siena, Siena Italy, where he is now Associate Professor. He teaches the "Electromagnetic Fields" course in the Information Engineering Bachelor Degree, and the "Mathematical Methods for Engineering" course in the Electronics and Communication Engineering Master Degree.

He is a Fellow of the IEEE (Antennas and Propagation Society) and a member of the European Association on Antennas and Propagation (EurAAP) and of the Italian Electromagnetics Society (SIEm).

He serves as a reviewer various international journals: IEEE Transaction on Antennas and Propagation, IEEE Antennas and Wireless Propagation Letters, Radio Science; and he is associate editor of the Journal of Electromagnetic Waves and Applications.

Awards

He was awarded with

- the "Giorgio Barzilai" young scientist best paper prize during the XIV National Electromagnetic Symposium RiNEM 2002,
- the URSI Commission B Young Scientist Award for support to attend the 2004 Electromagnetic Theory Symposium in Pisa, Italy, May 23-27, 2004,
- the Best Best Antenna Theory Paper Award at EUCAP2014, Den Haag.

He was co-author and advisor of the recipients of

- the Best Paper Award, First European Antenna Measurement Technique Association (AMTA) Symp., Munich, Germany 2006 .
- the "3rd Prize Young Scientist Best Paper Award" 2010 URSI EMTS, Berlin, Germany 2010.
- IEEE Student Member Prize 2014, Center-South Italy Chapter MTT-S/AP-S.

Collaborations and Projects

In November 2005 and January 2012 he joined as a visiting scientist the ElectroScience Lab of the Ohio State University (USA) collaborating with Prof. P. H. Pathak.

In February 2007, February 2008, and February 2015 he visited the Tokyo Institute of Technology (Japan), in collaboration with Prof. M. Ando and his group also hosting PhD students from TokyoTech at Univ. of Siena.

In November 2012, March 2013, May-June 2014, October 2015 he was a visiting professor at IETR Univ. of Rennes 1, Rennes, France, supported by the European Science Foundation New-Focus Grant, and by the Université Franco Italienne through the Galileo Project G13-82 "Millimeter wave Near Field Focusing Systems", in collaboration with Prof. R. Sauleau and his group.

In 2015 he was nominated invited professor in the 63rd section at the Université Pierre et Marie Curie, Sorbonne Universités, Paris, and he spent June 2015 with the Laboratoire d'Electronique et Electromagnétisme (L2E).

He was the leader of the University of Siena unit within the European Project 7FP METACHEM (2009-2013) about the design and production of chemically self-assembled metamaterials with innovative optical features.

He collaborates with several companies in the field of EM modelling; among them: IDS SpA (I), Leonardo (I), TICRA (DK).

He has participated as senior researcher or team leader in many research projects supported either by the European Union or by the European Space Agency. He taught several PhD courses within the European School of Antennas (ESoA) and the European Doctoral Programmes in Metamaterials (EUPROMETA).

Research Activities

High frequency methods

Prof. Albani research activity started in the area of high-frequency methods for electromagnetics, where he has been working for 20 years and today his expertise in the field is internationally recognized [A50]. Within the Uniform Geometrical Theory of Diffraction (UTD) he started focusing on **Double Wedge Diffraction** for which he proposed a novel UTD ray description for the more general geometrical configuration (source and observation at finite distance from two arbitrary arranged wedges) either in the frequency domain (FD) [A2] [A3] [A5] [B2] [A15] [A55] and in the Time Domain (TD) [A16]. This result is based on the development of a suitable two dimensional UTD transition function (generalization of the well-known Fresnel UTD transition function) which can uniformly describe the transitional behavior of the wedge doubly diffracted ray, including the overlapping of two (single-wedge-diffraction) transition regions, where the doubly diffracted ray experiences a two-fold transition, and the simple cascading of the respective (standard single-wedge) UTD diffraction coefficients of the two wedges fails. Prof. Albani also provided efficient and accurate algorithms for the numerical calculation of such a transition function [A37] [A41], which is based on the Generalized Fresnel Function, thus rendering the above UTD description fast and robust.

A similar transitional behavior is also exhibited by the ray diffracted at a **Pyramid Vertex**, i.e., at the interconnection of edges. This kind of contribution also experiences a two-fold transition at the overlapping of the transition regions associated to the two (single) wedge diffracted rays at two edges merging at the vertex. Prof. Albani also provided a novel UTD vertex diffraction coefficient, which uniformly describes this transitional behavior for the more general geometrical arrangement, either in the FD [A6][A27] [A34] [A64] or in the TD [A47] as the response to the analytic pulse.

The potentiality of the uniform asymptotic description of two fold integrals with two-fold transitions, which were clearly systematized in [A30], have been re-used for a **Ray-Description of Planar Array Antennas radiation** [A4] [A8] [A9] [B1], which was also exploited to build a Hybrid Method-of-Moments Ray Method for large arrays [A12] [A13], and to develop efficient quadrature rules for the **numerical calculation of Physical Optics** (PO) surface integrals for general arbitrary geometries [A38] [A48]. Still on **PO** but from the theoretical side, Prof. Albani investigated its reduction to a Line Integral providing a novel representation [A33] [A11] [A7] which is suitable for numerical applications, because free from singularities, but still providing a clear physical insight to the representation in terms of **Boundary Diffracted Waves** and Geometrical Optics.

Other relevant contributions of Prof. Albani in the area of High-frequency methods are those on the **Incremental Theory of Diffraction** [A6] [A20], on **experimental validations of UTD** [A22] [A56], on a novel fast Backward **Ray tracing** for multiple reflections and edge diffraction [A23] [A58], and investigations on various canonical problems like the **Quarterplane** [A19], the **Truncated Strip Grating** [A24], and a **rough wedge** (i.e., with rough faces and edge) [A26]. Recently, he also proposed a UTD coefficient for **triple diffraction** [A44] by generalizing the work on double diffraction.

Antenna Design

Beside the activity on high-frequency methods, Prof. Albani has been working both as a consultant for companies and as an academic researcher on antenna design. Among various practical design proposed for specific applications [A14][A29], and a pioneering investigation on gain enhancement by exploiting the Fabry-Perot leaky wave concept for array antennas, thus allowing thinning and coupling mitigation [A17], a remarkable work was done on the modeling and design of Radial Line Slot Arrays (**RLSA**) which are a type of planar low cost antenna solution driving increasing attention for their capabilities. Prof. Albani developed full wave simulator, based on the **Method of Moments**, custom tailored for RLSAs [A18], accelerated by means of numerical tricks based on high-frequency asymptotics [A25] [A52], including effects like slot plate **thickness** [A28] and metal **finite conductivity** [A39], which was used within an novel *ad-hoc* optimization scheme thus obtaining a general **automatic design** tool [A43]. Among various RLSA designs [A31] [A51] [A60], it is worth mentioning the recent innovative application of RLSA as a low-profile **Bessel Beam** launcher in near field focusing application [A53] [A57] [A59] [A63][A66][A67][A68].

Metamaterials and Plasmonics

After initial works in optics about **nanoantennas** [A21] [B3] conducted when he was with the Matter Physics Dept. Univ. of Messina, Prof. Albani developed a line of research on Metamaterials mainly focused on metamaterials in the optical range comprising plasmonic constituents like nano-spheres [A40], nano-shells [A36] (i.e., plasmonic coated dielectric spheres) or nano-clusters [A32] [A46] (collection of dielectric and plasmonic spheres), mainly in connection

with the METACHEM Project [B4]. Main objectives of the work have been the development of modelling tools and for the design of plasmonic metamaterials [A65], with special care about the definition of homogenized effective parameters and their extraction from full wave analysis of periodic crystals, including spatial dispersion [A62][A69]. A systematic approach was derived for the investigation of (complex) modes in a periodic crystal metamaterial, which was successfully applied also in the TeraHertz [A42] [A54] and in the Microwave [A45] range, and their excitation by an impinging wave at the metamaterial interface [A35].

Publications

Prof. Albani's research activity is documented by the following publications and by about 200 international conference contributions (the list of which is omitted for brevity).

Journal Papers

- [A1] F. Capolino, P. Bussotti, L. Borselli, M. Albani, S. Maci, "Effects of a fin edge close to a point caustic of a Gregorian antenna", *Microw. Opt. Tech. Letters.*, Vol. 14, No 1, pp. 20, 23 Jan. 1997.
- [A2] M. Albani, F. Capolino, S. Maci, R. Tiberio, "Diffraction at a thick screen including corrugations on the top face", *IEEE Trans. Antennas Propagat.*, Vol. 45, N. 2, Feb. 1997.
- [A3] F. Capolino, M. Albani, S. Maci, R. Tiberio, "Double Diffraction at a Pair of Coplanar, Skew Edges", *IEEE Trans. Antennas Propagat.*, Vol. 45, N.8, Aug. 1997.
- [A4] F. Capolino, M. Albani, S. Maci, R. Tiberio, "High-Frequency Analysis of an Array of Line Sources on a Truncated Ground Plane", *IEEE Trans. Antennas Propagat.*, Vol. 46, N.4, Apr. 1998.
- [A5] M. Albani, P. Piazzesi, F. Capolino, S. Maci, R. Tiberio, "Shielding effect of a Thick Screen with Corrugations", *IEEE Trans. Electromag. Compat.*, Vol. 40 N.3, Aug. 1998.
- [A6] S. Maci, M. Albani, F. Capolino, "ITD Formulation for the Currents on a Plane Angular Sector", *IEEE Trans. Antennas Propagat.*, Vol. 46, N.9, Sept. 1998.
- [A7] F. Mioc, M. Albani, P. Focardi S. Maci, "Line-Integral Representation of the Field Radiated by a Rectangular Waveguide Modal Current Distribution", *IEEE Trans. Antennas Propagat.*, Vol. 47, N.2, Feb. 1999.
- [A8] F. Capolino, M. Albani, S. Maci, L. B. Felsen, "Frequency Domain Green's Function for a Planar Periodic Semi-infinite Phased Array - Part I: Truncated Floquet Wave Formulation", *IEEE Trans. Antennas Propagat.*, Vol. 48, N.1, pp. 67-74, Jan. 2000.
- [A9] F. Capolino, M. Albani, S. Maci, L. B. Felsen, "Frequency Domain Green's Function for a Planar Periodic Semi-infinite Phased Array - Part II: Diffracted Wave Phenomenology," *IEEE Trans. Ant. Propagat.* Vol. 48, N.1, pp. 75-85, Jan. 2000.
- [A10] A. Cucini, M. Albani and S. Maci, "Una tecnica ibrida asintotica-metodo dei momenti per l'analisi di antenne a schiera di grandi dimensioni," *Atti della Fondazione Giorgio Ronchi*, Anno LVI, N. 4-5, July-Ott. 2001.
- [A11] M. Albani and S. Maci, "An Exact Line Integral Representation of the PO Radiation Integral from a Flat Perfectly Conducting Surface Illuminated by Elementary Electric or Magnetic Dipoles", *Turk. J. Elec. Engin.*, Vol.10, N.2, July 2002.
- [A12] A. Cucini, M. Albani and S. Maci, "Truncated Floquet Wave Full-Wave (T(FW)²) Analysis of Large Periodic Arrays of Rectangular Waveguides", *IEEE Trans. Antennas Propagat.*, Vol. 51, N. 6, pp. 1373-1385, June 2003.
- [A13] A. Cucini, M. Albani and S. Maci, " Truncated Floquet Wave Full-Wave Analysis of Large Phased Arrays of Open Ended Waveguides with a Non Uniform Amplitude Excitation", *IEEE Trans. Antennas Propagat.*, Vol. 51, N. 6, pp. 1386-1394 , June 2003.
- [A14] R. Gardelli, G. La Cono and M. Albani "A Low-Cost Suspended Patch Antenna for WLAN Access Points and Point-to-Point Links," *IEEE Antennas and Wireless Propagat.Letters*, Vol. 3, pp. 90-93, 2004.
- [A15] M. Albani "A Uniform Double Diffraction Coefficient for a Pair of Wedges in Arbitrary Configuration," *IEEE Transactions on Antennas and Propagation*, Vol. 53, N.2, Feb. 2005.
- [A16] F. Capolino and M. Albani "Time Domain Double Diffraction at a Pair of coplanar skew Edges," *IEEE Transactions on Antennas and Propagation*, Vol. 53, N. 4, April 2005.
- [A17] R. Gardelli, M. Albani, F. Capolino, "Array thinning by using antennas in a Fabry-Perot cavity for gain enhancement," *IEEE Transactions on Antennas and Propagation*, Vol. 54, N. 7, July 2006, pp. 1979-1990.
- [A18] M. Albani, G. La Cono, R. Gardelli, and A. Freni, "An Efficient Full-Wave Method of Moments Analysis for RLSA Antennas," *IEEE Transactions on Antennas and Propagation*, Vol. 54, N.8, Aug. 2006, pp. 2326-2336.
- [A19] M. Albani "On Radlow's quarter-plane diffraction solution," *Radio Sci.*, Vol. 42, RS6S11, Oct. 2007 (invited).
- [A20] A. Polemi, G. Carluccio, M. Albani, A. Toccafondi, and S. Maci, "Incremental Theory of Diffraction for Complex Point Source Illumination," *Radio Sci.*, Vol. 42, RS6S23, Dec. 2007

- [A21] S. Patanè, E. Cefali, S. Spadaro, R. Gardelli, M. Albani, M. Allegrini, "Polarization-maintaining near-field optical probes," *Journal of Microscopy*, Vol. 229, No. 2, Feb. 2008 , pp. 377-383.
- [A22] D. Erricolo, S. M. Canta, H. T. Hayvacı and M. Albani, "Experimental and Theoretical Validation for the Incremental Theory of Diffraction," *IEEE Transactions on Antennas and Propagation*, Vol. 56, N.8, Aug. 2008, pp. 2563-2570.
- [A23] G. Carluccio and M. Albani , "An Efficient Ray Tracing Algorithm for Multiple Straight Wedge Diffraction," *IEEE Transactions on Antennas and Propagation*, Vol. 56, N.11, Nov. 2008, pp. 3535-3542.
- [A24] F. Capolino and M. Albani "Truncation Effects in a Semi-infinite Periodic Array of Thin Strips: A discrete Wiener-Hopf Formulation," VOL. 44, RS2S91, doi:10.1029/2007RS003821, 2009.
- [A25] M. Albani, A. Mazzinghi, and A. Freni, "Asymptotic Approximation of Mutual Admittance Involved in MoM Analysis of RLSA Antennas," *IEEE Transactions on Antennas and Propagation*, Vol. 57, N. 4, April 2009, pp. 1057-1063.
- [A26] M. Albani, "Stochastic Theory of Edge Diffraction: An Alternative Formulation," *IEEE Transactions on Antennas and Propagation*, Vol. 57, no. 8, pp.2495-2497, Aug. 2009.
- [A27] M. Albani, F. Capolino, G. Carluccio, S. Maci, "UTD Vertex Diffraction Coefficient for the Scattering by Perfectly Conducting Faceted Structures," *IEEE Transactions on Antennas and Propagation*, Vol. 57, no. 12, pp.3911-3925, Dec. 2009.
- [A28] A. Mazzinghi, A. Freni, M. Albani, "Influence of the Finite Slot Thickness on RLSA Antenna Design," *IEEE Transactions on Antennas and Propagation*, Vol. 58, no. 1, pp.215-218, Jan. 2010.
- [A29] F. Mariottini, M. Albani, E. Toniolo, D. Amatori, S. Maci, "Design of a Compact GPS and SDARS Integrated Antenna for Automotive Applications," *IEEE Antennas and Wireless Propagation Letters*, Vol. 9, 2010 , pp. 405-408.
- [A30] G. Carluccio, M. Albani, P. H. Pathak, "Uniform Asymptotic Evaluation of Surface Integrals With Polygonal Integration Domains in Terms of UTD Transition Functions," *IEEE Transactions on Antennas and Propagation*, Vol. 58 , N. 4, pp 1155-1163, April 2010.
- [A31] H. Ueda, J. Hirokawa, M. Ando, M. Albani "A Coaxial Feeder with Two Pairs of Parasitic Pins for Realizing Rotationally Symmetric Aperture Illumination in Spiral Array Radial Line Slot Antennas," *IEICE Trans. on Communications*, Vol. E93-B No. 10 pp. 2554-2561, October 2010.
- [A32] A. Vallecchi, M. Albani, and F. Capolino, "Collective electric and magnetic plasmonic resonances in spherical nanoclusters," *Optics Express*, Vol. 19, No. 3, 31 January 2011, pp. 2754-2772; also selected by the Editors to be included in the *Virtual Journal for Biomedical Optics*, Vol. 6, No. 2, Feb. 17, 2011.
- [A33] M. Albani "Boundary Diffracted Wave and Incremental Geometrical Optics: a Numerically Efficient and Physically Appealing Line-Integral Representation of Radiation Integrals. Aperture Scalar Case," *IEEE Transactions on Antennas and Propagation*, Vol. 59 , N. 2, pp 586-594, Feb. 2011.
- [A34] M. Albani, G. Carluccio, and P. H. Pathak, "Uniform Ray Description for the PO Scattering by Vertices in Curved Surface With Curvilinear Edges and Relatively General Boundary Conditions," *IEEE Transactions on Antennas and Propagation*, Vol. 59, no. 5, May 2011 pp. 1587-1596.
- [A35] M. Albani and F. Capolino, "Wave dynamics by a plane wave on a half-space metamaterial made of plasmonic nanospheres: a discrete Wiener-Hopf formulation," *JOSA B*, Vol. 28, no. 9, pp. 2174-2185, Sept. 2011.
- [A36] S. Campione, M. Albani, and F. Capolino, "Complex modes and near-zero permittivity in 3D arrays of plasmonic nanoshells: loss compensation using gain [Invited]," *Optical Materials Express*, Vol. 1, no. 6, pp. 1077-1089, Sept. 2011.
- [A37] G. Carluccio, F. Puggelli, and M. Albani "Algorithm for the Computation of the Generalized Fresnel Integral," *IEEE Transactions on Antennas and Propagation*, Vol. 59, no. 10, October 2011, pp. 3943- 3947.
- [A38] G. Carluccio and M. Albani "Efficient adaptive numerical integration algorithms for the evaluation of surface radiation integrals in the high-frequency regime," *Radio Science*, Vol. 46, RS0E04, doi:10.1029/2010RS004623, June 2011.
- [A39] M. Albani, A. Mazzinghi, A. Freni, "Rigorous MoM Analysis of Finite Conductivity Effects in RLSA Antennas," *IEEE Transactions on Antennas and Propagation*, Vol. 59, no. 11, Nov. 2011 pp. 4023 - 4032.
- [A40] S. Campione, S. Steshenko, M. Albani, and F. Capolino , "Complex modes and effective refractive index in 3D periodic arrays of plasmonic nanospheres," *Optics Express*, Vol. 19, Issue 27, pp. 26027-26043, Dec. 2011.
- [A41] F. Puggelli, G. Carluccio, M. Albani, "An Efficient Algorithm for the Computation of the UTD T Transition Function," *IEEE Transactions on Antennas and Propagation*, Vol. 60 , no: 5, May 2012 , pp: 2380 - 2387
- [A42] S. Campione, S. Lannebère, A. Aradian, M. Albani, F. Capolino, "Complex modes and artificial magnetism in three-dimensional periodic arrays of titanium dioxide microspheres at millimeter waves," *Journal of the Optical Society of America B*, Vol. 29, Issue 7, pp. 1697-1706, July 2012.

- [A43] M. Albani, A. Mazzinghi, A. Freni, "Automatic Design of CP-RLSA Antennas," *IEEE Transactions on Antennas and Propagation*, Vol. 60 , no: 12, Dec. 2012 , pp: 5538-5547.
- [A44] G. Carluccio, F. Puggelli, M. Albani, "A UTD Triple Diffraction Coefficient for Straight Wedges in Arbitrary Configuration," *IEEE Transactions on Antennas and Propagation*, Vol. 60 , no: 12, Dec. 2012 , pp: 5809 - 5817.
- [A45] F. Capolino, A. Vallecchi, M. Albani, "Equivalent Transmission Line Model With a Lumped X-Circuit for a Metalayer Made of Pairs of Planar Conductors," *IEEE Transactions on Antennas and Propagation*, Vol..61, no.2, pp.852,861, Feb. 2013
- [A46] A. Vallecchi, M. Albani, and F. Capolino, "Effect of irregularities of nanosatellites position and size on collective electric and magnetic plasmonic resonances in spherical nanoclusters," *Opt. Express*, Vol. 21, no. 6, pp. 7667-7685, 2013.
- [A47] F. Puggelli, G. Carluccio, M. Albani, F. Capolino, "Time-Domain UTD Vertex Diffraction Coefficient for the Scattering by Perfectly Conducting Faceted Structures," *IEEE Transactions on Antennas and Propagation*, Vol. 61, Issue 8, 2013, Pages 4204-4213.
- [A48] C. Della Giovampaola, G. Carluccio, F. Puggelli, A. Toccafondi, M. Albani, "Efficient Algorithm for the Evaluation of the Physical Optics Scattering by NURBS Surfaces with Relatively General Boundary Condition," *IEEE Transactions on Antennas and Propagation*, Vol. 61, no. 8, 2013, Pages 4194-4303.
- [A49] A. Freni, A. Mazzinghi, M. Albani, "Comments on "a novel technique in simplifying the fabrication process and improving the reflection coefficient of the linear polarized radial line slot array (LP-RLSA) antennas,"" *Journal of Electromagnetic Waves and Applications*, Vol. 27, no. 14, 1 September 2013, Pages 1859-1860.
- [A50] P. H. Pathak, G. Carluccio, M. Albani, "The Uniform Geometrical Theory of Diffraction and Some of Its Applications," *IEEE Antennas and Propagation Magazine*, vol.55, no.4, pp.41,69, Aug. 2013
- [A51] A. Mazzinghi, M. Albani, A. Freni, "LP-RLSA Design for Low-Cost Transportable BASYLIS Radar," *IEEE Antennas and Propagation Magazine*, vol.55, no.5, pp.275-285, Oct. 2013
- [A52] G. Valerio, M. Casaletti, J. Seljan, R. Sauleau, M. Albani, "Efficient Computation of the Coupling Between a Vertical Line Source and a Slot," *IEEE Transactions on Antennas and Propagation*, vol. 61, no. 12, December 2013, pp. 6084-6092.
- [A53] M. Ettore, G. Valerio, R. Sauleau, M. Albani, L. Le Coq, S. Pavone, M. Casaletti, "On the Near-Field Shaping and Focusing Capability of a Radial Line Slot Array," *IEEE Transactions on Antennas and Propagation*, vol. 62, no. 4, April 2014, pp. 1991-1999
- [A54] S. Lannebère, S. Campione, A. Aradian, M. Albani, and F. Capolino, "Artificial magnetism at terahertz frequencies from three-dimensional lattices of TiO₂ microspheres accounting for spatial dispersion and magnetoelectric coupling," *J. Opt. Soc. Am. B*, vol. 31, no. 5, pp. 1078-1086, May 2014.
- [A55] G. Carluccio, F. Puggelli, M. Albani, "Generalization of UTD Double Diffraction to the Case of Impenetrable Wedges With Relatively General Boundary Conditions," *IEEE Transactions on Antennas and Propagation*, vol.62, no.7, pp.3829-3834, July 2014
- [A56] T. Negishi, V. Picco, D. Spitzer, D. Erricolo, G. Carluccio, F. Puggelli, M. Albani, "Measurements to Validate the UTD Triple Diffraction Coefficient," *IEEE Transactions on Antennas and Propagation*, vol.62, no.7, pp.3723,3730, July 2014
- [A57] M. Albani, S. Pavone, M. Casaletti, and M. Ettore, "Generation of non-diffractive Bessel beams by inward cylindrical traveling wave aperture distributions," *Opt. Express*, vol. 22, pp. 18354-18364, Jul. 2014.
- [A58] F. Puggelli, G. Carluccio, M. Albani, "A Novel Ray Tracing Algorithm for Scenarios Comprising Pre-Ordered Multiple Planar Reflectors, Straight Wedges, and Vertexes," *IEEE Transactions on Antennas and Propagation*, vol.62, no.8, pp.4336-4341, Aug. 2014
- [A59] A. Mazzinghi, M. Balma, D. Devona, G. Guarnieri, G.; Mauriello, M. Albani, A. Freni, "Large Depth of Field Pseudo-Bessel Beam Generation With a RLSA Antenna," *IEEE Transactions on Antennas and Propagation*, vol.62, no.8, pp.3911-3919, Aug. 2014
- [A60] A.Mazzinghi, M. Albani, A. Freni, "Double-Spiral Linearly Polarized RLSA," *IEEE Transactions on Antennas and Propagation*, vol.62, no.9, Sept. 2014, pp. 4900-4903.
- [A61] O. Yurduseven, D. Cavallo, A. Neto, G. Carluccio, M. Albani, "Parametric analysis of extended hemispherical dielectric lenses fed by a broadband connected array of leaky-wave slots," *IET Microwaves, Antennas & Propagation*, Vol. 9, no. 7, pp. 611-617, May 2015.
- [A62] V. Sozio, A. Vallecchi, M. Albani, F. Capolino, "Generalized Lorentz-Lorenz homogenization formulas for binary lattice metamaterials," *Phys. Rev. B* 91, 205127 –22 May 2015

- [A63] M. Ettore, S. C. Pavone, M. Casaletti, M. Albani, "Experimental Validation of Bessel Beam Generation Using an Inward Hankel Aperture Distribution," *IEEE Transactions on Antennas and Propagation*, vol.63, no.6, pp.2539-2544, June 2015
- [A64] M. Albani, G. Carluccio, P. H. Pathak, "A Uniform Geometrical Theory of Diffraction for Vertices Formed by Truncated Curved Wedges," *IEEE Transactions on Antennas and Propagation*, vol.63, no.7, pp.3136-3143, July 2015.
- [A65] V. Ponsinet, P. Barois, S.M. Gali, P. Richetti, J.B. Salmon, A. Vallecchi, M. Albani, A. Le Beulze, S. Gomez-Grana, E. Duguet, S. Mornet and M. Treguer-Delapierre "Resonant Isotropic Optical Magnetism of Plasmonic Nanoclusters in Visible Light." *Physical Review B*, Vol. 92, N. 22, Article Number: 2204140, Dec. 18th 2015.
- [A66] S. C. Pavone, M. Ettore, M. Casaletti, and M. Albani, "Transverse circular-polarized Bessel beam generation by inward cylindrical aperture distribution," *Opt. Express*, Vol. 24, n. 10, pp. 11103-11111, 2016
- [A67] W. Fuscaldo, S. C. Pavone, G. Valerio, A. Galli, M. Albani, M. Ettore, "Analysis of limited-diffractive and limited-dispersive X-waves generated by finite radial waveguides," *Journal of Applied Physics*, Vol. 119, n. 19, 21/05/2016.
- [A68] S. C. Pavone, M. Ettore and M. Albani, "Analysis and Design of Bessel Beam Launchers: Longitudinal Polarization," *IEEE Transactions on Antennas and Propagation*, vol. 64, no. 6, pp. 2311-2318, June 2016.
- [A69] D. Tihon, V. Sozio, N. A. Ozdemir, M. Albani and C. Craeye, "Numerically Stable Eigenmode Extraction in 3-D Periodic Metamaterials," *IEEE Transactions on Antennas and Propagation*, vol. 64, no. 7, pp. 3068-3079, July 2016.
- [A70] M. Casaletti, G. Valerio, R. Sauleau and M. Albani, "Mode-Matching Analysis of Lossy SIW Devices," *IEEE Transactions on Microwave Theory and Techniques*, vol. 64, no. 12, pp. 4126-4137, Dec. 2016.
- [A71] D. Comite, W. Fuscaldo, S.C. Pavone, G. Valerio, M. Ettore, M. Albani, A. Galli, "Propagation of nondiffracting pulses carrying orbital angular momentum at microwave frequencies," *Applied Physics Letters*, Vol. 110, N. 11, March 2017
- [A72] D. Comite, G. Valerio, M. Albani, A. Galli, M. Casaletti, M. Ettore, "Exciting Vorticity Through Higher Order Bessel Beams With a Radial-Line Slot-Array Antenna," *IEEE Transactions on Antennas and Propagation*, Vol. 65, N. 4, pp. 2123-2128, April 2017.
- [A73] S. C. Pavone, E. Martini, F. Caminita, M. Albani, S. Maci "Surface Wave Dispersion for a Tunable Grounded Liquid Crystal Substrate without and with Metasurface on Top," *IEEE Transactions on Antennas and Propagation*, Vol. 65, N. 7, pp. 3540-3548, May 2017
- [A74] S. C. Pavone, A. Mazzinghi, A. Freni, M. Albani, "Comparison between broadband Bessel beam launchers based on either Bessel or Hankel aperture distribution for millimeter wave short pulse generation," *Optics express*, Vol. 25, N. 16, pp. 19548-19560, Oct 2017.
- [A75] L. Pandolfo, P. De Vita, M. Bandinelli, G. Carluccio, M. Albani, "A Flexible, General-Purpose Code Based on the Iterative Physical Optics Algorithm: Analyzing Electromagnetic Scattering in Electrically Large Scenarios," *IEEE Antennas and Propagation Magazine*, Vol. 59, N. 5, pp. 150-158, Oct 2017.
- [A76] A. Mazzinghi, A. Freni, A. Agostini, L. Bossio, and M. Albani "Industrial Antenna Development for 77-GHz Level-Crossing Monitoring Radar," *IEEE Antennas and Propagation Magazine*, Vol. 60, N. 5, Oct 2018.
- [A77] M. Camacho, A. P. Hibbins, F. Capolino and M. Albani, "Diffraction by a truncated planar array of dipoles: A Wiener–Hopf approach," *Wave Motion*, Vol. 89, June 2019, Pages 28-42.
- [A78] S. C. Pavone, M. Casaletti and M. Albani, "Automatic Design of a CP Fan-Beam Linear Slotted Array in SIW Technology," *IEEE Access*, vol. 7, pp. 155977-155985, 2019, doi: 10.1109/ACCESS.2019.2949181.
- [A79] S. C. Pavone, A. Mazzinghi and M. Albani, "PO-based Automatic Design and Optimization of a Millimeter Wave Sectoral Beam Shaped Reflector," *IEEE Transactions on Antennas and Propagation*, doi: 10.1109/TAP.2020.2971523.

Book Chapters

- [B1] M.Albani, F. Capolino, A.Cucini, L.B. Felsen, S.Maci, F. Mariottini, E.Martini, A. Polemi, R. Tiberio, and A. Toccafondi, "The Truncated Floquet Wave Diffraction Theory for Planar Phased Arrays: an Overview," in *Fields, Networks, Computational Methods, and Systems in Modern Electrodynamics, A Tribute to Leopold B. Felsen*, Springer Proceedings in Physics, Vol. 97 P. Russer and M. Mongiardo Eds., 2004, pp. 75-93. ISBN: 978-3-540-23929-1.
- [B2] M. Albani "Uniform Double Diffraction Coefficient for a Pair of Wedges in Arbitrary Configuration," in *Electromagnetics in a Complex World, Challenges and Perspectives*, Springer Proceedings in Physics, Vol. 96 I. M. Pinto, V. Galdi, and L. B. Felsen Eds., 2004, pp. 215-222. ISBN: 978-3-540-20235-6.
- [B3] E. Cefali, S. Patanè, S. Spadaro, R. Gardelli, M. Albani, M. Allegrini, "Near Field Probes: from optical fibers to optical nanoantennas." Chapter 3, pp. 77-136, in *Applied Scanning Probe Methods*, vol. 8, *Scanning Probe*

Microscopy Techniques, B. Bhushan, H. Fuchs, M. Tomitori Eds., Springer Series, NanoScience and Technology 2008, Series ISSN: 1434-4904, ISBN: 978-3-540-74079-7.

- [B4] M. Albani, F. Capolino, C. Craeye, C. Simovski, A. Vallecchi “Design of nanostructured metamaterials in METACHEM,” in A. De Baas et alii Eds. *Nanostructured Metamaterials – Exchange between experts in electromagnetics and material science*, Luxembourg: Publications Office of the European Union, 2010, ISBN 978-92-79-07563-6.
- [B5] M. Ettore, S. C. Pavone, M. Casaletti, M. Albani, A. Mazzinghi, A. Freni, “Near-Field Focusing by Non-diffracting Bessel Beams,” in A. Boris, R. Sauleau, (Eds.) *Aperture Antennas for Millimeter and Sub-Millimeter Wave Applications*, Ed. Springer, 2017, pp. 243-288, Ch. 8.

Patents

- [P1] “Antenna modulare particolarmente adatta per stazioni radio base TETRA”, Publication date: 2010-11-09, Inventor(s): Albani Matteo; Caminita Francesco; Maci Stefano. Applicant(s): LEA ANTENNE & PROGETTI S P A, Application number: IT2009VR00063 20090508.
- [P2] “Slotted waveguide antenna for near-field focalization of electromagnetic radiation”, Priority date: 2011-12-29 Inventor(s): Balma Massimo, Guarnieri Giacomo, Mauriello Giuseppe, Recami Erasmo, Zamboni Rached Michel, Freni Angelo, Mazzinghi Agnese, Albani Matteo. Applicant(s): SELEX ES SPA. Application number: EP20120829123 20121228. EP2798699 (A1) — 2014-11-05.
- [P3] “Radar obstacle detector for a railway crossing”, date of filing: 2014-05-23, Inventor(s): Albani Matteo; Mazzinghi Agnese; Freni Angelo. Applicant(s): Progress Rail Inspection & Information Systems Srl, Application number: 14425062.8-1812.
- [P4] “Radar obstacle detector for a railway crossing”, date of filing: 2015-04-02, Inventor(s): Albani Matteo; Mazzinghi Agnese. Applicant(s): Progress Rail Inspection & Information Systems Srl, Application number: 15162487.1-1811.
- [P5] “Reflector for a Fixed Position Radar Antenna”, date of filing 07-01-2018, Inventor(s): Agostini Alessandro, Mazzinghi Agnese, Albani Matteo, Applicant(s): Progress Rail Inspection & Information Systems SRL, Application number: EP20160177483 20160701