Amir Mortazawi

Education	Ph.D. (Electrical Engineering), UT at Austin, Aug. 1990, Advisor: Tatsuo Itoh M.S. (Electrical Engineering), UT at Austin, Dec. 1988, Advisor: Tatsuo Itoh B.S. (Electrical Engineering), SUNY at Stony Brook NY, May 1987

Research and Work Experience

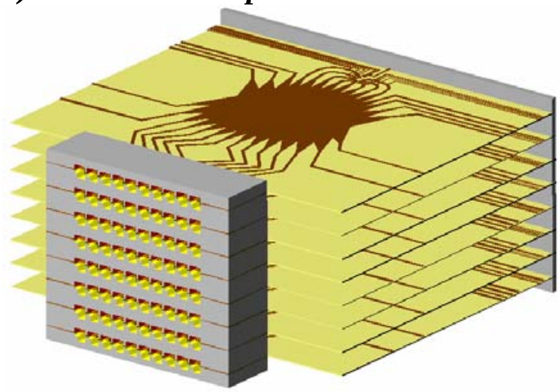
8/01 – Present	Department of electrical Engineering and Computer Science University of Michigan *Associate Professor*
8/98 – 8/01	Department of Electrical and Computer Engineering North Carolina State University *Associate Professor*
8/95 – 8/98	Department of Electrical and Computer Engineering University of Central Florida *Associate Professor*
8/90 - 8/95	Department of Electrical and Computer Engineering University of Central Florida *Assistant Professor* *Taught graduate and undergraduate courses in the areas of electromagnetics and microwaves.* *Conducted research in the areas of microwaves and millimeter-waves.*
9/87 - 8/90	Electrical Engineering Research Laboratory Department of Electrical and Computer Engineering The University of Texas at Austin *Research Assistant* *Performed nonlinear analysis of microwave oscillators. Microwave power combining techniques. Designed microwave and millimeter wave circuits.*
9/87 - 5/88	Microwave Laboratory Department of Electrical and Computer Engineering The University of Texas at Austin *Teaching Assistant-Senior Design Course* *Supervised design and fabrication of microwave active and passive circuits.*
5/87 - 9/87	Long Haul Lightwave System Development Department AT&T Bell Laboratories, Holmdel, NJ *Engineer, part time.* *Designed X-band microwave amplifier for laser driver.*
5/85 - 9/87	Quantum Electronics Laboratory Physics Dept., State University of New York at Stony Brook *Performed microwave instrumentation and measurements.* *Constructed microwave circuits.*
5/84 - 5/85	Low Temperature Solid State Laboratory Physics Dept., State University of New York at Stony Brook *RF excited plasma etching and electron scanning microscopy.* *Designed and constructed broad-band hf source for plasma etching.*

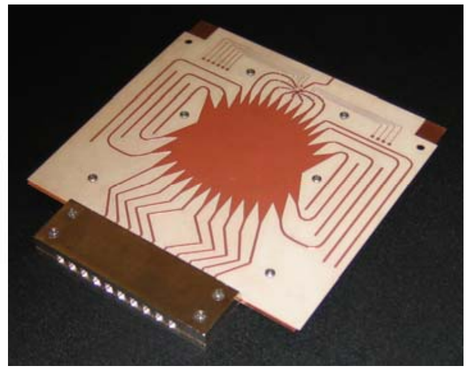
Fellow IEEE, Editor in Chief, IEEE Transactions on Microwave Theory and Techniques, Elected Member of AdCom, IEEE MTTS, Associate Editor, IEEE MTTS, National Science Foundation Research Initiation Award, Electrical and Computer Engineering Dept. Teacher of the Year for 1994, University Teaching Incentive Award in 1996, Associate editor for IEEE transactions on Antennas and propagation, Guest Editor for the Special Issue of the IEEE Transactions Microwave Theory and Techniques, Dec. 1995, Chair, Technical Program Sub-Committee on Active and Quasi-Optical Arrays IEEE MTT-S, Co-chair MTT-16, Microwave Systems Applications, Phased Arrays, Secretary to Administrative Committee IEEE MTT 2004

Research Summary

My research projects have been funded by ,ARL/BAE, Motorola, NASA, Lockheed Martin, ARO MURI, DARPA, MAFET-III, and DARPA, FAME and NSF programs.

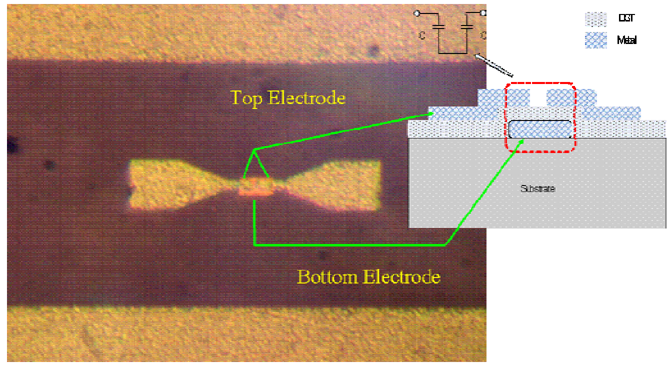
1) Dual scan dual polarized millimeter-wave arrays





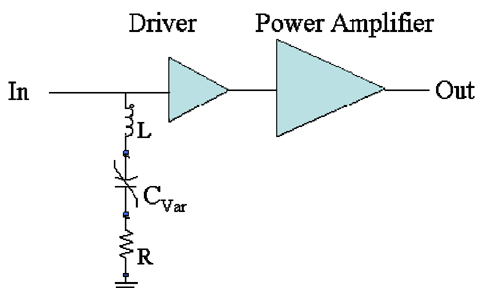
Suited for millimeter-wave imaging and point-to-multipoint communications, the multifunctional phased array is based upon a compact, robust, and easily expandable tray based architecture. The phased array system is broadband, thereby allowing for superior image resolution when implemented as a radar, or high data rates when implemented as a communication system. Moreover, through independent processing of the two polarization channels, radar target information such as the polarization signature and rotational velocity can be readily determined. For communication applications, the two polarization channels effectively double the bandwidth. Finally, with the growing interest in multiple-input-multiple-output (MIMO) communications, considerably increased user and data capacity can be achieved though simultaneously using several of the input/output ports for multibeam RF beamforming, thus resulting in better conditioned scattering channels. Its applications include high resolution radar imaging, polarimetric radar, automotive collision avoidance systems, broadband point-to-multipoint communications, multibeam MIMO systems.

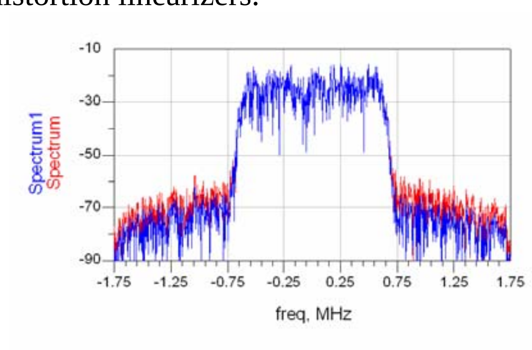
***2) Tunable low loss thin film BST (barium strontium titanate) varactors for tunable rf fronteds*:** This project was initially supported by a DARPA FAME and an NSF ITR grant. It is currently supported by Motorola and NSF. Central to this effort is the use of barium strontium titanate (BST) thin films. BST is a low loss, high dielectric constant non-linear dielectric material. The electric field dependence of BST permittivity allows fabrication of varactors for the design of tunable RF and microwave circuits. Several areas that will greatly benefit from incorporation of such tunable capacitors are: a) the design of efficient DC to DC converters, b) low loss IF and RF tunable filters, c) low phase noise oscillators for wireless applications, d) Tunable matching circuits, e) . Other applications of this material such as tunable antennas and phase shifters.



We have devised new measurement techniques to be able to fully characterized various losses in thin film based tunable capacitors. Furthermore, we have developed several new circuits to take advantage of ferroelectric varactor’s properties. Examples of such new circuits include:

a) Pre-distortion linearizers for RF power amplifiers: This is a very low cost and simple circuit for linearizing RF PAs in cell phones. It provides higher linearity with a lower loss compared to schottky diode based pre-distortion linearizers.





b) A new low cost electronically steered array: In a conventional phased array system, the signal is divided into many branches using a power splitter and each branch is then fed into a phase shifter and followed by an antenna. The cost of a conventional phased array mainly depends on the cost of the phase shifters used. It has been estimated that almost half of the cost of a phased array is due to the cost of phase shifters. Because of the high cost of phase shifters, a significant amount of research has been performed to minimize the cost and improve the performance of phase shifters. In addition, conventional phased arrays result in very complex structures and suffer from high loss and mass.

We have developed a novel technique to design low-cost phased array systems. It eliminates the need for separate power splitter and phase shifters used in conventional phased array systems. Since the phasing and power splitting are performed simultaneously, the phased array cost is reduced substantially. Also, phased arrays based on this technique are compact and have simple circuit structures. The bandwidth of the phased arrays based on this technique is narrower than the bandwidth of conventional phased array systems. Also, the scanning range is limited to approximately 45 degrees.

There are many applications where this technique can be utilized, such as early warning systems, automotive radars and satellite communications.

3) Spatial/quasi optical power combining amplifiers and transmit-receive arrays**:** The motivation for this work has been the lack of efficient solid state devices that can generate high enough power in the millimeter and sub-millimeter-wave region for radar, remote sensing and spaceborne communication. This problem can be alleviated by spatially combining the power produced from many solid-state devices (conventional circuit level combiners suffer from high losses at mm-wave frequencies). We have developed millimeter-wave circuits based on multiple layer structures that directly produce and amplify microwave beams Furthermore, we designed, constructed and delivered 33 GHz hard horn feeds for the excitation these amplifiers. A software package was developed for analysis of hard horns and was provided to Lockheed-Martin. Our effort within this project was fundamental in achieving the program goals (MAFET III review, March, 1999, Reston, Virginia). This project has been funded by an ARO MURI and a DARPA MAFET III subcontract.

My contributions to this area are:

a) Developed a technique for the near field excitation of quasi-optical power amplifier arrays in order to design practical and efficient two port power amplifiers. This technique is based on the design of “Hard Horn Feeds” which provide a uniform amplitude and phase across the array and has been adopted by Lockheed Martin Corporation. Fig. 1a shows the general concept for the excitation of spatial amplifier array via hard horn feeds. Figs 1b and 1c show the predicted and measured nearfield aperture power distribution for a 33 GHz hard horn. Indeed by using this technique one can distribute the microwave energy uniformly across a large array.

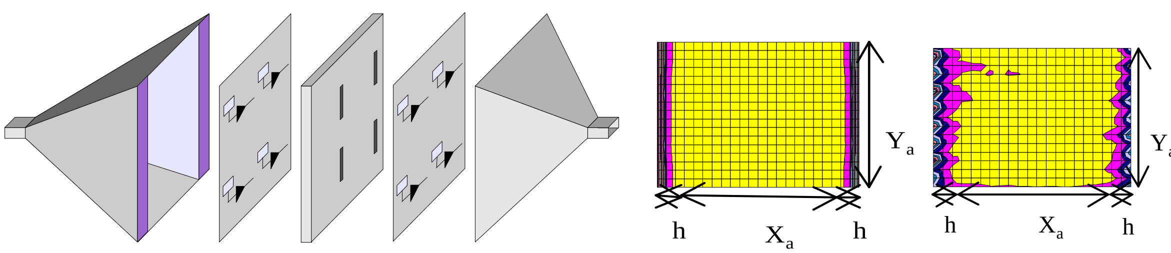


Fig. 1a: A multilayer spatial amplifier array, Figs. 1b &1c: simulated and measured nearfield power distribution for a 33 GHz hard horn feed

b) Developed the general concept and designed a multilayer spatial power amplifier array. The most important feature of this amplifier array is the heat sinking and EM isolation provided by a ground plane separating the driver and the final amplifier stages (Fig. 1a). Our amplifiers generated 25 W at Ka band (33 GHz). The amplifier was designed and fabricated through a collaboration with Lockheed/Martin (Figs. 2a, b). A 50 W array was designed and fabricated fabricated.

Figs. 2a, b and c A 25 W, Ka band spatial amplifier array with hard horn feed

Shown below is a millimeter wave tray based power amplifier which was also developed. The amplifier uses a novel microstrip to waveguide transition that allows low loss compact transition aperture coupled radiating elements. This type of transition has been used to develop a new phase shifter for high power applications (please see publications). The try based design is the backbone of our mm-wave dual polarized dual scan phased array radar discussed above.

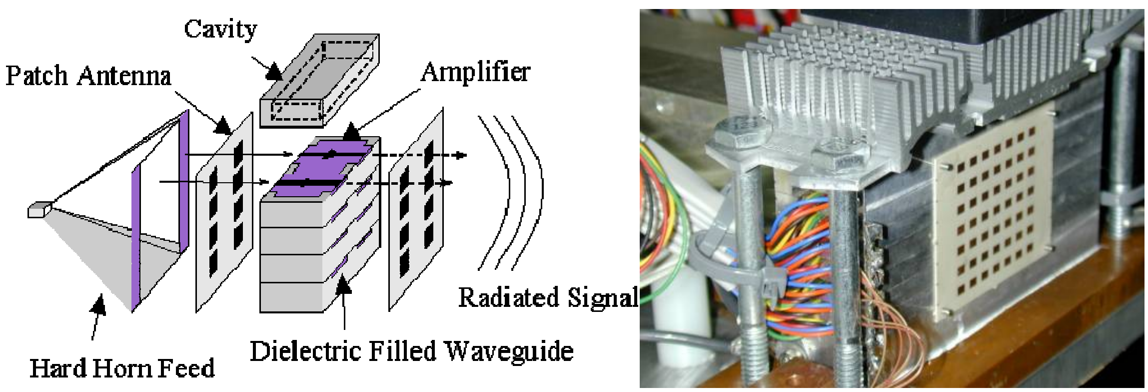
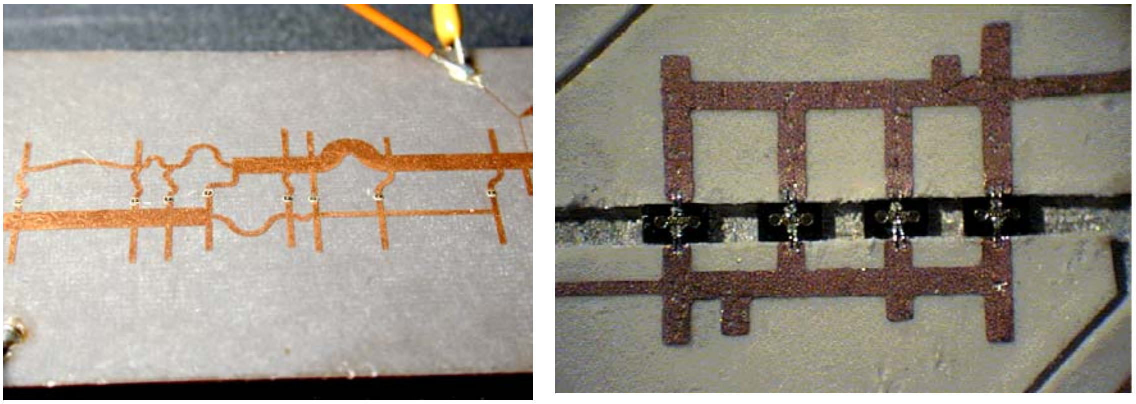


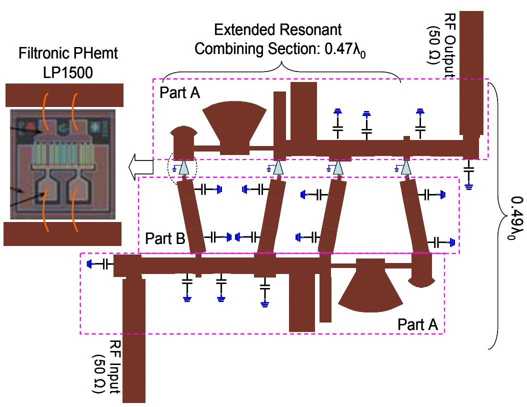
Fig. 2c A Ka band tray based Spatial Power Amplifier

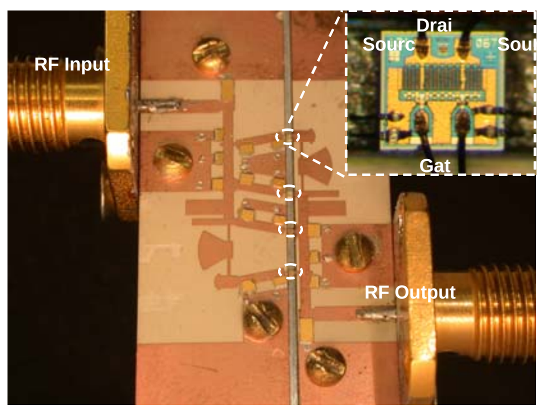
4) Extended resonance power amplifiers: One of the distinguishing features of this technique is that resonance is achieved through mutual interaction of multiple devices connected to a transmission line. This effectively places multiple solid state power devices in shunt. There is no need for complications normally added in the design of conventional hybrid type power amplifiers. The extended resonance circuits are very compact since they eliminate the need for matching circuits for the individual devices. This type of structure is compatible with MMIC fabrication. The extended resonance holds strong potential in wireless applications. We have designed and demonstrated successfully extended resonance amplifiers for mobile communications (1 GHz class E with 70% power added efficiency), at X band (10 GHz) and at Ka Band (33 GHz).



Figs. 3a,b Photographs of a 1 GHz 4 Watts class E and a 400 mW, 33 GHz power amplifier

Our most recent extended resonance power amplifier design is based on a novel broadband power combining circuit synthesis technique. This technique enables the design of multiple-device power amplifiers with compact layout similar to the distributed power amplifiers while achieving very good power combining efficiency over a wide bandwidth. We have designed and fabricated a 4-to-10 GHz power amplifier with a small signal gain of 9.9 dB with a 2-dB bandwidth of 6.5 GHz. More importantly, this design demonstrates an output power level of 31.9 dBm at 1-dB compression with power combining efficiencies around 90% over most of the bandwidth of interest.





Teaching Summary

In the past fifteen years I have been teaching various courses in the areas of Circuits, RF/Microwave Engineering and Electromagnetics. Throughout my teaching career I have emphasized on introducing real life design examples and projects in my courses. Because of this, I developed and taught laboratory courses in RF and Microwaves areas (UCF). I received the university teaching incentive award in 1996 at UCF.

Courses taught at the University of Michigan:

EECS 330: *Second electromagnetic Course*
EECS 411: *Microwave Circuits*
EECS 498: *RF Engineering*
EECS 525: *Advanced Solid-State Microwave Circuit Design*
EECS 598: *RF Power Amplifier Design, developed course*

The Following courses are taught in conjunction with NCSU (VBEE) video based program and with the National Technological University.

ECE 492F: *RF Engineering, developed course*
ECE 592F: *RF Engineering, developed course*
ECE 791R: *RF Amplifier and Oscillator, developed course*

In addition, I taught the following courses at the University of Central Florida from 1990-1998:

1. EEL 3307C *Electronics I*
2. EEL 3470 *Electromagnetics Fields*
3. EEL 4436C *Microwave Engineering*
4. EEL 5434 *Microwave Circuits and Devices*
5. EEL 5555C *RF Communications*
6. EEL 6492 *Advanced Topics in Electromagnetics and Microwaves, Nonlinear Analysis of Microwave Circuits*

PHD Students Graduated:

Tony Ivanov
Adam Martin
San Ortiz
Mete Ozkar
Ayman Al-Zayed
Jin Zhang
Ali Tombak
Jian Xin

MS. Students Graduated (with MS. Thesis):

Adam Martin
Rizwan Bashirullah
Maha Ali
Arul Balasubramanian
Sean Ortiz
John Heinbockel
Kely Lear
Shahed Reza
Mohamed Rahman

Current PhD Students:

Lora Sculwitz
Jonghoon Choi
Xinen Zhu
Jia-Shiang Fu
Danial Ehyaii
Meng- Hung Chen

Pending Patents

A. Mortazawi, L. Shulwitz, “A Compact Dual Polarized Multibeam Phased Array, August 15, 2005, UoM invention disclosure number 3181

A. Mortazawi, A. Tombak, “A Power Divider Phase Shifter Circuit”, May 22, 2003. UoM invention disclosure # 2559, International Patent Application Number: PCT/US2004/016008

A. Mortazawi, N. Gupta, A. Tombak, “A Predistortion Linearizer for Power Amplifiers”, UM Tech Transfer Office is currently pursuing the patent. Dec. 2003, UoM invention disclosure # 2691, Provisional patent application has been filed.

A. Mortazawi, A. Kingon, J. P. Maria, M. B. Steer, J. Nath, Novel frequency-tunable antennae for wireless devices employing a varactor integrated with the radiating metallization and a co-fabrication method for the same, Patent Disclosure to North Carolina State University on July, 2004.

List of Publications

Book and Book Chapters

J. Choi, A. Mortazawi, Book Chapter on “Microwave Oscillators,” Wiley Encyclopedia of Electrical and Electronics Engineering, New York: John Wiley, 2004

A. Mortazawi, Book Chapter, “Quasi-Optical Techniques,” Handbook of RF and Microwave Components, Chapter 7 on Wiley Interscience, 2003, co-authored with P. Gold-Smith, T. Itoh and K. Stephan

Active Antennas and Quasi-Optical Arrays,” IEEE, Press, 1998, Edited by: A. Mortazawi, T. Itoh and J. Harvey

A. Mortazawi, A chapter on “Microwave Oscillators,” Encyclopaedia of Electrical Engineering, John Wiley, Editor: John Webster, Univ. of Wisconsin, Madison, 1998

A Mortazawi, L. Brokman and J. Hubert, "Multilayer and Distributed Arrays," Book Chapter, Active and Quasi-Optical Arrays for Solid-State Power Combing, Editor: R. A. York and Z. B. Popovic, John Wiley and Sons, Inc., 1997

Refereed Journals

1) J. Choi and A. Mortazawi, “Design of Push-Push and Triple-Push Oscillators for Reducing 1/*f* Noise Upconversion,” *IEEE Transactions on Microwave Theory and Technique,* Volume 53, Issue 11, Nov. 2005 Pages:3407 – 3414

2) L. Schulwitz and A. Mortazawi, “A Compact Dual Polarized Multibeam Phased Array Architecture for Millimeter-Wave Radar,” *IEEE Transactions on Microwave Theory and Technique,* Volume 53, Issue 11, Nov. 2005 Pages:3588 - 3594

3) M. Ozkar and A. Mortazawi, "Electromagnetic modeling and optimization of spatial power combiners/dividers with hard horns", under revision, *IEEE Transactions on Antennas and Propagation,* Volume: 53, Issue: 1, Jan 2005, Pages: 144-150

4) Jonghoon Choi, Amir Mortazawi, "Free-space power combining oscillator array for Solar power transmission," *the Radio Science Bulletin, International Union of Radio Science, URSI,* N0. 311, Dec 2004, Pages 47-54

5) Z. Jin, S. Ortiz, and A. Mortazawi, "Design and Performance of a new digital phase shifter at X-band," *IEEE Microwave and wireless components letters*, Volume: 14, Issue: 9, Sept. 2004, Pages: 428 - 430

6) N. Gupta, A. Tombak, and A. Mortazawi, "A Predistortion Linearizer Using a Tunable Resonator," *IEEE Microwave and Wireless Components Letters,* Volume: 14, Issue: 9 , Sept. 2004, Pages: 431 - 433

7) A. Tombak and A. Mortazawi, "A Novel Low-Cost Beam-Steering Technique Based on the Extended-Resonance Power-Dividing Method," *IEEE Transactions on Microwave Theory and Techniques*, Volume: 52, Issue: 2 , Feb. 2004, Pages: 664 – 670

8) X. Jiang, S. Ortiz and A. Mortazawi, "A Ka-Band Power Amplifier Based on the Traveling-Wave Power-Dividing/Combining Slotted-Waveguide Circuit" *IEEE Transactions on Microwave Theory and Techniques*, Volume: 52, Issue: 2, Feb. 2004, Pages: 633 – 639

9) X. Jiang; Martin, A. L.; Mortazawi, A.; "A class-B push-pull power amplifier based on an extended resonance technique", *IEEE Microwave and Wireless Components Letters*, Volume: 13, Issue: 12, Dec. 2003, Pages: 550 – 552

10) M. Ozkar; G. Lazzi; A. Mortazawi; "A modified unsplit PML formulation for evanescent mode absorption in waveguides", *IEEE Microwave and Wireless Components Letters*, Volume: 13, Issue: 6 , June 2003, Pages: 220 – 222

11) J. Xin; L. Li; S.C. Ortiz; R. Bashirullah; A. Mortazawi; "A Ka-band power amplifier based on a low-profile slotted-waveguide power-combining/dividing circuit", *IEEE Transactions on Microwave Theory and Techniques*, Volume: 51 , Issue: 1, Jan. 2003, Pages: 144 – 147

12) Tombak, A.; Maria, J.-P.; Ayguavives, F.T.; Zhang Jin; Stauf, G.T.; Kingon, A.I.; Mortazawi, A., "Voltage-controlled RF filters employing thin-film barium-strontium-titanate tunable capacitors", *IEEE Transactions on Microwave Theory and Techniques*, Volume: 51 , Issue: 2, Feb 2003, Pages: 462 – 467

13) Batty, W.; Christoffersen, C.E.; Yakovlev, A.B.; Whitaker, J.F.; Mortazawi, A.; Al-Zayed, A.; Ozkar, M.; Ortiz, S.C.; Reano, R.M.; Yang, K.; Katehi, L.P.B.; Snowden, C.M.; Steer, M.B.; "Global coupled EM-electrical-thermal simulation and experimental validation for a spatial power combining MMIC array" *IEEE Transactions on Microwave Theory and Techniques*, Volume: 50, Issue: 12, Dec. 2002, Pages: 2820 - 2833

14) A Tombak; J.-P Maria; F. Ayguavives; Jin Zhang; G.T. Stauf,; A.I. Kingon,; A. Mortazawi, "Tunable barium strontium titanate thin film capacitors for RF and microwave applications", *IEEE Microwave and Wireless Components Letters*, Volume: 12 , Issue: 1 , Jan. 2002, Pages: 3 – 5

15) Sean Ortiz, John Hubert, Lee Mirth, Erich Schlecht and Amir Mortazawi, “A High Power ka-Band Quasi-Optical Amplifier Array,” *IEEE Transactions on Microwave Theory and Techniques*, Volume: 50 , Issue: 2 , Feb. 2002, Pages: 487–494

16) F. Ayguavives, Z. Jin, J. P. Maria, A. Tombak, A. Mortazawi, A. I. Kingon, G. T. Stauf, C. Ragaglie, J. F. Roeder and M. Brand, “Contribution of dielectric and metallic losses in RF / microwave tunable varactors using (Ba,Sr)TiO3 thin films”. *Integrated Ferroelectrics*, 39, pp. 1343-1352, 2001

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18) A. Martin and A. Mortazawi, “A Ka Band Power Amplifier Based on an Extended Resonance Technique,” *IEEE Microwave and Guided Wave Letters,* pp. 475-477, Nov. 2000

19) A.B. Yakovlev, S. Ortiz, M. Ozkar, A. Mortazawi, and M.B. Steer, “A Waveguide Based Aperture-Coupled Patch Amplifier Full Wave System Analysis and Experimental Validation: Full-Wave System Analysis and Experiment,” *IEEE Transactions on Microwave Theory and Techniques,* Vol. MTT-48, pp. 2692-2699, Dec. 2000

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21) R. Bashirullah and Amir Mortazawi, “A slotted Waveguide Quasi-Optical Power Amplifier”, *IEEE Trans. Microwave Theory and Techniques*, vol. MTT-48, pp. 1142-1147, July 2000

22) M. Ozkar and A. Mortazawi,” Analysis and Design of an Inhomogeneous Waveguide Transformer With Hard Walls,” *IEEE Microwave and Guided Wave Letters*, February 2000

23) S. Ortiz, T. Ivanov and A. Mortazawi, "A CPW Fed Microstrip Patch Quasi-Optical Amplifier Array," *IEEE Trans. Microwave Theory and Tech*., vol. MTT-48. pp. 276-280, Feb. 2000

24) A. Martin and A. Mortazawi, "A Class E Power Amplifier based on an Extended Resonance Technique,*" IEEE Trans. Microwave Theory and Tech.,* vol. MTT-48, pp. 93-97, January 2000

25) A. Yakovlev, A. Khalil, C. Hicks, A. Mortazawi and M. Steer, "The Generalized Scattering Matrix of Closely Spaced Strip and Slot Layers in Waveguide," *IEEE Trans. Microwave Theory and Tech.*, vol. MTT-48, pp. 126-137, January 2000

26) M. Ali, S. Ortiz, T. Ivanov. and A. Mortazawi, “Analysis and Measurement of Hard Horn Feeds for the Excitation of Quasi-Optical Amplifiers,” IEEE Trans. Microwave Theory and Tech., pp. 479-487, April 1999

27) Z. Popovic and Amir Mortazawi, “Quasi-Optical Transmit/Receive Front Ends,” IEEE Trans. Microwave Theory Tech., vol. MTT-46, pp. 1964-1975, Nov. 1998

28) A. Martin, A. Mortazawi and B.C. De Loach Jr. “An Eight Device Extended Resonance Power Amplifier,” *IEEE Trans. Microwave Theory and Tech.,* vol. MTT-46, pp. 844-850, June 1998

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30) M. Rahman, T. Ivanov and A. Mortazawi, “A Twenty-six MESFET Spatial Power Combining Oscillator,” *IEEE Microwave and Guided Wave Lett*., pp. 100-102, April 1997

31) T. Ivanov and A. Mortazawi, "A Two Stage Spatial Amplifier with Hard Horn Feeds," *IEEE Microwave and Guided Wave Letters*, pp. 88-90, Feb. 1996

32) A. Martin, A. Mortazawi and B.C. De Loach Jr. "A Power Amplifier Based on an Extended Resonance Technique," *IEEE Microwave and Guided Wave Letters*, vol. 5, no. 10, pp. 329-331, October 1995

33) T. Ivanov, A. Balasubramaniyan and A. Mortazawi, "One and Two Stage Spatial Amplifiers," *IEEE Transactions on Microwave Theory Tech.*, vol. MTT-43, no. 9, pp. 2138-2143, Sep. 1995

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36) Arul Balasubramaniyan and Amir Mortazawi, "Two-Dimensional MESFET-Based Spatial Power Combiners," *IEEE Microwave and Guided Wave Letters*, Vol. 3, no. 10, pp. 366-368, Oct. 1993

37) A. Mortazawi and B. C. De Loach Jr., "A Two Dimensional Power Combining Array Employing an Extended Resonance Technique," IEEE Microwave and Guided Wave Letters, Vol. 3, no. 7, pp. 214-216, July 1993

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45) L. Moorman, E. J. Galvez, B. E. Sauer, A. Mortazawi, K. A. H. Van Leevween, G. V. Oppen and P. M. Koch, "Two-Frequency Microwave Quenching of Highly Excited Hydrogen Atoms," *Physical Review Letters*, Vol 61, No 7, pp. 771-774, Aug. 1988

Conferences

1) J. Choi and A. Mortazawi, “A novel low phase noise multiple-device oscillator based on the extended resonance technique,” Accepted for presentation in *IEEE MTT-S International Microwave Symposium, 2006*

2) J. Fu, X. Zhu, D.Y. Chen, J. Philips and A. Mortazawi, “A Linearity Improvement Technique for Thin-film Barium Strontium Titanate Capacitors,” Accepted for presentation in *IEEE MTT-S International Microwave Symposium, 2006*

3) L. Schulwitz and A. Mortazawi, “A New Low Loss Rotman Lens Design for Multibeam Phased Arrays,” Accepted for presentation in *IEEE MTT-S International Microwave Symposium, 2006*

4) A. Tombak and A. Mortazawi, “An X-band low-cost compact phased array based on the extended resonance power dividing technique", *IEEE APS International Conference on Antennas and Propagation*, Washington, DC, Volume 1A, 3-8 July 2005 Page(s):334 - 337 Vol. 1A

5) Xinen Zhu, Ding-Yuan Chen, Zhang Jin, Jamie D. Phillips and Amir Mortazawi, "Characterization of Thin Film BST Tunable Capacitors Using A Simple Two Port Measurement Technique," *IEEE MTT-S International Microwave Symposium,* June 2005 Page(s):611 - 614

6) L. Schulwitz and A. Mortazawi, "A Broadband Millimeter-Wave Dual Polarized Phased Array for Radar Front End Applications," *IEEE MTT-S International Microwave Symposium*, June 2005.

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Other Published work

A. Mortazawi and B.C. De Loach Jr., "Spatial Power Combining Circuits Based on a Extended Resonance Method," Proceedings of the Workshop on Millimeter-Wave Power Generation and Beam Control, U.S. Army Missile Command, AL, September 1993

Funded Projects

Amir Mortazawi, "Novel Circuits for the Design of Low-Cost Millimeter Wave Phased Arrays," *NSF*, May 2005-April 2008

Amir Mortazawi, Ferroelectric Based Adaptive RF Transceivers, *Motorola*, Sept. 2004 – Aug. 2007

Amir Mortazawi (Co-PI), CTA: Compact MMW Dual Polarized Multifunction Active Array Technology, *ARL/BAE*, Oct. 2002-Sept. 2006

Amir Mortazawi, BST Based Power Amplifier Linearization and Adaptive Matching Circuits, *NSF*, May 2003-April 2006

Amir Mortazawi (Co-PI) with Dimitris Pavlidis, AlGAN/GAN heterostucture FET free space combining, *NSF/NASA*, October 2002 – Spetember 2004

Amir Mortazawi (PI), with kamal Sarabandi, Concept Study of a Quasi-optical Phased Array for 60-GHz Secure Communications System, *AFOSR*, 2003

Amir Mortazawi (PI), with Angus Kingon, “Integrated Radio Frequency Transceiver Frontends for High Data Rate Wireless Communications”, *NSF ITR SI*, August 2001-July 2004

Amir Mortazawi (Co-PI) with Kamal Sarabandi (PI) and other Co-PIs, GLORIA: geo-stationary LEO radar imaging array, NASA, 2003

Amir Mortazawi (Co-PI), Wilson Pearson (PI), “Fundamental Technology for Spatial Power Combining at Millimeter-Wave Length" *MURI, Army Research Office*, June 1997 - June 2003.

Amir Mortazawi (PI) with Michael Steer, “Research Equipment, Fundamental Study of Quasi-Optical Amplifier Arrays,” DURIP *U.S. Army Research Office,* May 2000, April 2001

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Amir Mortazawi (Co-PI), A. I. Kingon (PI), J. P. Maria, "Tunable Ferroelectric Thin film Varactor," *DARPA/ATMI*, June 98 - May 2002

Amir Mortazawi (Co-PI) with Lockheed-Martin, “A 35 GHz Quasi-Optical Amplifier," *DARPA MAFET Thrust II,I* Sept. 1997 – Jan., 2000

Amir Mortazawi, “Development of a New and Efficient Power Amplifier Based on an Extended Resonance Technique, *Lockheed-Martin Corporation,* May 97 - May 98

Amir Mortazawi, "Electrical Characterization and Optimization of Ceramic Multilayer Packages" *SAWTEK*, Sept. 97 - Dec. 97

Amir Mortazawi, "Quasi-Optical Amplifiers," *Lockheed/Martin Corporation*, April 96 - Aug. 97

Amir Mortazawi, Gift from *NEC Corporation, Japan,* 1996, 1997

Amir Mortazawi, "Design and Analysis of intra-wafer coupling mechanisms for quasi-optical amplifiers," *Martin Marietta Corporation* 1995

Amir Mortazawi, "A Novel Technique Capable of Producing Solid-State High Power Microwave Amplifiers for Space Base Communications," *Florida Space Grant*, *NASA*, 1995

Amir Mortazawi, "Quasi-Optical Amplifiers and Up and Down Converters,” *Martin Marietta Corporation*, 1994

Amir Mortazawi, "Novel Millimeter-wave Power Combining structures," *NSF Initiation Awards*, 1991-1993

Invited Talks/Workshops

Invited Talk: University of Illinois, Urbana, Champaign, "Adaptive RF Circuits Based on Thin Film BST" September 2005

Invited Talk: DAPRA Workshop on 60 GHz Secure Communication Networks
Title: Technology Roadmap for 60 GHz Secure Networking

Invited Talk, Kyoto University, 2003 Japan–United States Joint Workshop on Space Solar Power System (JUSPS'03), J. Choi, A. Mortazawi and D. Pavlidis, "An approach for solar power conversion to high RF power for wireless transmission," Workshop Proceeding

Invited Talk: IEEE MTTS 2003, Workshop on New Advances in Microwave and Millimeter-Wave Filters
Title: Ferroelectric based tunable RF filters

IEEE, University of Toronto Invited Talk on Millimeter-Wave Spatial Power Combining, 2002

Organizer of the workshop "*Spatial and Quasi-Optical Power Combining Arrays*," IEEE MTT-S, June 2000

Workshop Presentation, *"Spatial and Quasi-Optical Power Combining Arrays," IEEE MTT-S*, June 2000

Workshop Presentation, *"RF Applications of BST Material," IEEE MTT-S,* June 2000

Workshop Presentation, "Spatially Combined Fault Tolerant Masthead Power Amplifiers," IEEE Topical Workshop on Power Amplifiers for Wireless Communications, 11-12 September 2000, San Diego, CA

Invited: A. Mortazawi," ARO Workshop on Spatial and Quasi-Optical Power Combining," March 1997, Santa Barbara, CA

Invited: A. Mortazawi "An Extended Resonance Power Combining Amplifier," 4th Int. Workshop on Integrated Nonlinear Microwave and Millimeter-wave Circuits, October 1996, Duisburg, Germany

Invited: A. Mortazawi, "Workshop on Design Approaches for Integrated Circuit Antenna Modules," 1995 IEEE AP-S Int. Symp and URSI Radio Science Meeting, June 1995, CA

A. Mortazawi and B.C. De Loach Jr., "A Spatial Power Combining Circuit Based on a Extended Resonance Method," Workshop on Millimeter-Wave Power Generation and Beam Control, U.S. Army Missile Command, AL, September 1993, A summary of this presentation appeared in the proceedings of this workshop, pp. 275-279, 1993

Invited: Amir Mortazawi, "Quasi-Optical Power Combining, Components, Systems and Analysis," Millimeter and Microwave Quasi-Optical Power Combining Workshop sponsored by U.S. Army Research Office, Georgia Tech Research Institute, Georgia Tech Institute of Technology, Atlanta, 19-20 September 1991

Other Scholarly Work

Reviewer for the National Science Foundation
Reviewer for the IEEE Transactions on Microwave Theory and Techniques
Reviewer for the IEEE Microwave and Guided Wave Letters

Professional Contributions

Editor in Chief, IEEE Transactions on Microwave Theory and Techniques, Jan 2006-Present

Elected Member of the Administrative Committee (AdCom) IEEE Microwave Theory and Technique Society, 2006-2008

NSF Panel Member for various programs

Associate Editor, IEEE Transaction Microwave Theory and Techniques, Jan 2005-Dec. 2006

Secretary to Administrative Committee, IEEE MTT

Associate Editor for the IEEE Transactions Antennas and Propagation

Chair, Technical Program Committee on Active and Quasi-Optical Arrays, IEEE MTTS

Co-Chair, IEEE MTT-16 committee on systems applications, Phased Arrays

Member of the Technical Program Committee for the IEEE Antennas and Propagation Conference 1999

Guest Editor for the Special Issue of the IEEE Transactions Microwave Theory and Techniques, Dec. 1995

Member of the Steering Committee for the IEEE International Microwave Symposium, 1995

Member of the Technical Program Committee for the IEEE International Microwave Symposium, 1994 - present

Chaired the session "Active and Quasi-Optic Arrays," IEEE International Microwave Symposium, 1994

Education Chair, IEEE Orlando Section, 1994 - 1997

Chair, IEEE Antennas and Propagation/Microwave Theory and Techniques Orlando Chapter, September 1994 - September 1995

Vice Chair, IEEE Antennas and Propagation/Microwave Theory and Techniques, Orlando Chapter, 1993

Secretary, IEEE Antennas and Propagation/Microwave Theory and Techniques, Orlando Chapter, 1992

Local Arrangements, IEEE Antennas and Propagation/Microwave Theory and Techniques, Orlando Chapter, 1991

Member of the Technical Program Committee for the IEEE Southcon 1994

Organized and chaired the session "Microwave and Millimeter Wave devices and Circuits," IEEE Southcon 1994

Chaired the session "Semiconductors," the 17th International Conference on Infrared and Millimeter-Waves, Dec. 92, CALTECH