

REFERENCES

- [1] A. S. Gilmour, Jr., *Klystrons, Traveling Wave Tubes, Magnetrons, Cross Field Amplifiers, and Gyrotrons*. Norwood, MA, USA: Artech House, 2011.
- [2] J. Feinstein and K. Felch, "Status Review of Research on Millimeter-Wave Tubes," *IEEE Trans. Electron Devices*, 1987, v. 34, pp. 461–467.
- [3] J. A. Eichmeier and M. K. A. Thumm, *Vacuum Electronics: Components and Devices*. Berlin, Germany: Springer-Verlag, 2008.
- [4] S. H. Gold and G. S. Nusinovich, "Review of High-Power Microwave Source Research," *Rev. Sci. Instrum.*, 1997, v. 68, pp. 3945–3974.
- [5] S. E. Tsimring, *Electron Beams and Microwave Vacuum Electronics*. Hoboken, NJ, USA: Wiley, 2007.
- [6] G. S. Nusinovich, *Introduction to the Physics of Gyrotrons*. Baltimore, MD: Johns Hopkins Univ. Press, 2004.
- [7] V. L. Granatstein, R. K. Parker, and C. M. Armstrong, "Vacuum Electronics at the Dawn of the Twenty-First Century," *Proc. IEEE*, 1999, v. 87, pp. 702–716.
- [8] W. Chen, G. S. Nusinovich, and V. L. Granatstein, "Nonlinear Theory of Gyrotwystrons with Stagger-Tuned Cavities," *IEEE Trans. Plasma Sci.*, 1999, v. 27, n. 2, pp. 429–437.
- [9] K. R. Chu, V. L. Granatstein, P. E. Latham, W. Lawson, and C. D. Striffler, "A 30 MW Gyroklystron Amplifier Design for High Energy Linear Accelerators," *IEEE Trans. Plasma Sci.*, 1985, v. 13, n. 6, pp. 424-434.
- [10] J. M. Baird and W. Lawson, "Magnetron Injection Gun (MIG) Design for Gyrotron Applications," *Int. J. Electron.*, 1986, v. 61, n. 6, pp. 953–967.
- [11] W. Lawson, J. Calame, V. L. Granatstein, G. S. Park, C. D. Striffler, and J. Neilson, "The Design of a High Peak Power Relativistic Magnetron Injection Gun," *Int. J. Electron.*, 1986, v. 61, n. 6, pp. 969–984.
- [12] J. Choi, A. H. McCurdy, F. Wood, R. H. Kyser, J. P. Calame, K. Nguyen, B. G. Danly, T. Antonsen, B. Levush, and R. K. Parker, "Experimental Investigation of a High Power, Two-Cavity, 35 GHz Gyroklystron Amplifier," *IEEE Trans. Plasma Sci.*, 1998, v. 26, pp. 416–425.
- [13] M. Thumm and W. Kasperek, "Passive High-Power Microwave Components," *IEEE Trans. Plasma Sci.*, 2002, v. 30, n. 3, pp. 755–786.
- [14] K. R. Chu, "The Electron Cyclotron Maser," *Rev. of Modern Phys.*, 2004, v. 76, n. 2, pp. 489–540.
- [15] R. Q. Twiss, "Radiation Transfer and the Possibility of Negative Absorption in Radio Astronomy," *Australian J. Phys.*, 1958, v. 11, pp. 564–579.
- [16] A. V. Gaponov, "Interaction Between Electron Fluxes and Electromagnetic Waves in Waveguides," *Izv. VUZ., Radiofizika*, 1959, v. 2, pp. 450–462; and "Addendum," *Izv. VUZ., Radiofizika*, 1959, v. 2, pp. 836–837.
- [17] J. Schneider, "Stimulated Emission of Radiation by Relativistic Electrons in a Magnetic Field," *Phys. Rev. Lett.*, 1959, v. 2, n. 12, pp. 504–505.

- [18] V. V. Zheleznyakov, "On the Instability of Magneto-Active Plasma Relative to High-Frequency Electromagnetic Perturbations," *Izv. VUZov Radiofizika*, 1960, v. 3, no. 1, pp. 57–66.
- [19] A. V. Gaponov, A. L. Goldenberg, D. P. Grigor'ev, I. M. Orlova, T. B. Pankratova, and M. I. Petelin, "Induced Synchrotron Radiation of Electrons in Cavity Resonators," *JETP Lett.*, 1965, v. 2, pp. 267–269.
- [20] A. V. Gaponov, M. I. Petelin, and V. K. Yulpatov, "The Induced Radiation of Excited Classical Oscillators and its Use in High Frequency Electronics," *Radiophys. Quantum Electron*, 1967, v. 10, pp. 794.
- [21] V. V. Alikaev, G. A. Bobrovskii, M. M. Ofitserov, V. I. Poznyak, and K. A. Razumova, "Electron-Cyclotron Heating on the Tokamak TM-3," *JETP Lett.*, 1972, v. 15, pp. 27–31.
- [22] V. A. Flyagin, A. V. Gaponov, I. Petelin and V. K. Yulpatov, "The Gyrotron," *IEEE Trans. Microwave Theory Tech.*, 1977, v. 25, no. 6, pp. 514-521.
- [23] G. S. Nusinovich, "Mode Interaction in Gyrotrons," *Int. J. Electron.*, 1981, v. 51, pp. 457–474.
- [24] M. V. Kartikeyan, E. Borie, and M. K. A. Thumm, *Gyrotrons, High Power Microwave and Millimeter Wave Technology*. New York: Springer-Verlag, 2004.
- [25] A. V. Gaponov-Grekhov and V. L. Granatstein, *Eds., Applications of High-Power Microwaves*. London, U.K.: Artech House, 1994.
- [26] G. S. Nusinovich, M. K. A. Thumm, and M. Petelin, "The Gyrotron at 50: Historical Overview," *J. Infrared Millim. THz Waves*, 2014, v. 34, pp. 325–381.
- [27] K. L. Felch, B. G. Danly, H. R. Jory, K. E. Kreischer, W. Lawson, B. Levush, and R. J. Temkin, "Characteristics and Applications of Fast-Wave Gyrodevices," *Proc. IEEE*, 1999, v. 87, pp. 752–781.
- [28] R. Cairns and A. Phelps, *Generation and Application of High Power Microwaves*, ser. Scottish Grad.. New York, NY, USA: Taylor & Francis, 1997.
- [29] I. I. Antakov, M. A. Moiseev, E. V. Sokolov, and E. V. Zasyipkin, "Theoretical and Experimental Investigation of X-Band Two-Cavity Gyroklystron," *Int. J. of Infrared and Millimeter Waves*, 1994, v. 15, pp. 873-887.
- [30] E. V. Zasyipkin, M. A. Moiseev, I. G. Gachev, and I. I. Antakov, "Study of High-Power Ka-Band Second Harmonic Gyroklystron Amplifier," *IEEE Trans. Plasma Sci.*, 1996, v. 24, pp. 666–670.
- [31] V. L. Granatstein, B. Levush, B. G. Danly, and R. K. Parker, "A Quarter Century of Gyrotron Research and Development," *IEEE Trans. Plasma Sci.*, 1997, v. 25, pp. 1322–1335.
- [32] V. L. Granatstein and W. Lawson, "Gyro-Amplifiers as Candidate RF Drivers for Tev Linear Colliders," *IEEE Trans. Plasma Sci.*, 1996, v. 24, pp. 648–665.
- [33] J. P. Calame, M. Garven, J. J. Choi, K. Nguyen, F. Wood, M. Blank, B. G. Danly, and B. Levush, "Experimental Studies of Bandwidth and Power Production in a

- Three-Cavity, 35 GHz, Gyroklystron Amplifier," *Phys. Plasmas*, 1998, v. 6, pp. 285–297.
- [34] M. Garven, J. P. Calame, K. T. Nguyen, B. G. Danly, B. Levush, and F. N. Wood, "Experimental Studies of a Four-Cavity, 35 GHz Gyroklystron Amplifier," *IEEE Trans. Plasma Sci.*, 2000, v. 28, n. 3, pp. 672–680.
- [35] M. Blank, B. G. Danly, B. Levush, J. P. Calame, K. Nguyen, D. Pershing, J. Petillo, T. Hargreaves, R. True, A. Theiss, G. Good, K. Felch, B. James, P. Borchard, T. Chu, H. Jory, W. Lawson, and T. Antonsen, "Demonstration of 10 kW Average Power 94 GHz Gyroklystron Amplifier," *Phys. Plasmas*, 1999, v. 6, pp. 4405–4410.
- [36] Steven H. Gold, Arne W. Fliflet, Wallace M. Manheimer, Douglas A. Kirkpatrick, W. Murray Black, A. K. Kinkead, D. L. Hardesty, and M. S. Sucy, "Millimeter-Wave Gyroklystron Amplifier Experiment Using a Relativistic Electron Beam." *IEEE Trans. Plasma Sci.*, 1990, v. 18, n. 6, pp. 1021–1027.
- [37] W. Lawson, J. Calame, B. Hogan, P. E. Latham, M. E. Read, V. L. Granatstein, M. Reiser, and C. D. Striffler, "Efficient Operation of a High Power X-Band Gyroklystron," *Phys. Rev. Lett.*, 1991, v. 67, pp. 520–523.
- [38] S. G. Tantawi, W. T Main, P. E. Latham, G. S. Nusinovich, W. G. Lawson, C. D. Striffler and V. L. Granatstein, "High-Power X-Band Amplification from an Overmoded Three-Cavity Gyroklystron with a Tunable Penultimate Cavity," *IEEE Trans. Plasma Sci.*, 1992, v. 20, pp. 205–215.
- [39] L. R. Barnett, K. R. Chu, J. M. Baird, V. L. Granatstein, and A. T. Drobot, "Gain, Saturation and Bandwidth Measurements of the NRL Gyrotron Traveling Wave Tube," *IEEE Int. Electron Devices Meeting*, 1979, pp. 164–167.
- [40] R. S. Symons, H. R. Jory, S. J. Hegji, and P. E. Ferguson, "An Experimental Gyro-TWT," *IEEE Trans. Microwave Theory Tech.*, 1981, v. 29, pp. 181–184.
- [41] L. R. Barnett, Y. Y. Lau, K. R. Chu, and V. L. Granatstein, "An Experimental Wideband Gyrotron Traveling-Wave Amplifier," *IEEE Trans. Electron Devices*, 1981, v. 28, pp. 872–875.
- [42] C.-H. Du, P.-K. Liu, *Millimeter-wave gyrotron traveling-wave tube amplifiers*, Berlin, Germany: Springer-Verlag, 2014.
- [43] K. C. Leou, D. B. McDermott, A. J. Balkcum, and N.C. Luhmann Jr., "Stable High-Power TE Gyro-TWT Amplifiers," *IEEE Trans. Plasma Sci.*, 1994, v. 22, n. 10, pp. 585–592.
- [44] K. C. Leou, D. B. McDermott, and N. C. Luhmann, Jr., "Large-Signal Characteristic of a Wide-Band Dielectric-Loaded Gyro-TWT Amplifier," *IEEE Trans. Plasma Sci.*, 1996, v. 24, n. 6, pp. 718–726.
- [45] G. G. Denisov, V. L. Bratman, A. W. Gross, W. He, A. D. R. Phelps, K. Ronald, S. V. Samsonov, and C. G. Whyte, "Gyrotron Traveling Wave Amplifier with a Helical Interaction Waveguide," *Phys. Rev. Lett.*, 1998, v. 81, pp. 5680–5683.
- [46] K. R. Chu, H. Y. Chen, C. L. Hung, T. H. Chang, L. R. Barnett, S. H. Chen, T. T. Yang, and D. Dialetis, "Theory and Experiment of Ultrahigh Gain Gyrotron

- Traveling-Wave Amplifier," *IEEE Trans. Plasma. Sci.*, 1999, v. 27, n. 4, pp. 391–404.
- [47] J. P. Calame, M. Garven, B. G. Danly, B. Levush, and K. T. Nguyen, "Gyrotron-Traveling Wave-Tube Circuits Based on Lossy Ceramics," *IEEE Trans. Electron Devices*, 2002, v. 49, n. 8, pp. 1469–1477.
- [48] J. Wang, Y. Luo, Y. Xu, R. Yan, Y. Pu, X. Deng, and H. Wang, "Simulation and Experiment of a Ku-Band Gyro-TWT," *IEEE Trans. Electron Devices*, 2014, v. 61, n. 6, pp. 1818–1823.
- [49] R. Yan, Y. Tang, and Y. Luo, "Design and Experimental Study of a High-Gain W-Band Gyro-TWT with Nonuniform Periodic Dielectric Loaded Waveguide," *IEEE Trans. Electron Devices*, 2014, v. 61, n. 7, pp. 2564–2569.
- [50] C. H. Du and P. K. Liu, "Stability Study of a Gyrotron-Traveling-Wave Amplifier Based on a Lossy Dielectric-Loaded Mode-Selective Circuit," *Phys. Plasmas*, 2009, v. 16, n. 7, pp. 073-104.
- [51] C.-H. Du, P.-K. Liu, "A Lossy Dielectric-Ring Loaded Waveguide with Suppressed Periodicity for Gyro-TWTs Applications", *IEEE Trans. Electron Devices*, 2009, v. 56, n. 10, pp. 2335-2342.
- [52] M. Thumm, "State-of-the-Art of High Power Gyro-Devices and Free Electron Maseres Update 2013," *Institut für HochleistungsimpulsundMikrowellentechnik (IHM) Karlsruhe Inst. Technol., Karlsruhe, Germany, KIT Sci. Rep. 7662*, 2014.
- [53] A. J. Lichtenberg, "Prebunched Beam Traveling-Wave Tube Studies." *IRE Trans. Electron Devices*, 1962, v. 9, n. 4, pp. 345-351.
- [54] <http://www.radartutorial.eu/08.transmitters/twystron.en.html>
- [55] A. D. LaRue and R. R. Rubert, 'Multi-Megawatt Hybrid TWT's at S-Band and C-Band," *IEEE Electron Devices Meet.*, Washington, D.C., Oct. 1964.
- [56] R. J. Butwell, F. Friedlander, and G. T. Hunter, "Oscillation Suppression in Multi-Megawatt Cloverleaf Twystrons by Stagger-Tuned Lossy Resonant Cavities," *Electron Devices Meeting*, IEEE, 1969, pp. 100-102.
- [57] V. L. Bratman, M. A. Moiseev, M. I. Petelin, and R. E. Erm, "Theory of Gyrotrons with a Non-Fixed Structure of the High-Frequency Field," *Radiophys. Quantum Electron.*, 1973, v. 16, n. 4, pp. 622-630.
- [58] M. A. Moiseev, "Maximum Amplification Band of a CRM Twistron," *Radiophys. Quantum Electron.*, 1977, v. 20, n. 8, pp. 1218-1223.
- [59] T. M. Tran, K. E. Kreischer, and R. J. Temkin, "Theory of harmonic gyro-twystron," MIT Plasma Science and Fusion Center 1985.
- [60] G. S. Nusinovich, and H. Li, "Theory of Gyro-Travelling-Wave Tubes at Cyclotron Harmonics," *Int. J. Electron.*, 1992, v. 72, n. 6, pp. 895-907.
- [61] G. S. Nusinovich and H. Li, "Theory of the Relativistic Gyrotwistron," *Phys. Fluids B*, 1992, v. 4, n. 4, pp. 1058–1065.
- [62] P. E. Latham, W. Lawson, V. Irwin, B. Hogan, G. S. Nusinovich, H. W. Matthews, and M. K. E. Flaherty, "High Power Operation of an X-Band Gyrotwistron," *Phys. Rev. Lett.*, 1994, v. 72, n. 23, pp. 3730–3734.

- [63] P. E. Latham, G. S. Nusinovich, and J. Cheng, "Stability of Gyrotwistrons," *Proc. Particle Accel. Conf.*, 1993, pp. 2659–2660.
- [64] P. E. Latham and G. S. Nusinovich, "Optimum Operation of Gyrotwistrons," *Proc. Particle Accel. Conf.*, 1993, pp. 2661–2663.
- [65] P. E. Latham and G. S. Nusinovich, "Theory of Relativistic Gyro-Traveling Wave Devices," *Phys. Plasmas*, 1995, v. 2, n. 9, pp. 3494–3510.
- [66] P. E. Latham and G. S. Nusinovich, "Stability Analysis of Relativistic Gyro-Traveling Wave Devices," *Phys. Plasmas*, 1995, v. 2, n. 9, pp. 3511–3523.
- [67] W. Lawson, P. E. Latham, J. P. Calame, J. Cheng, B. Hogan, G. S. Nusinovich, V. L. Granatstein, M. Reiser, "High Power Operation of Fundamental-Mode and Second Harmonic Gyro-twystrons," *J. Appl. Phys.*, 1995, v. 78, pp. 550–559.
- [68] Perry Malouf and Victor Granatstein, "Design and Computer Simulation of a Gyrotwystron," *Int. J. Electron.*, 1992, v. 72, n. 6, pp. 943–958.
- [69] G. S. Nusinovich, P. M. Malouf, and V. L. Granatstein, "Theory of Gyrotwystrons with Mixed Transverse Geometries of the Various Stages," *IEEE Trans. Plasma Sci.*, 1994, v. 22, n. 5, pp. 518–525.
- [70] P. M. Malouf, V. L. Granatstein, S. Y. Park, G. S. Park, C. M. Armstrong, "Performance of a Wideband Three-Stage Mixed Geometry Gyro-twystron Amplifier," *IEEE Trans. Electron Devices*, 1995, v. 42, n. 9, pp. 1681–1685.
- [71] Perry M. Malouf, and Grigory S. Nusinovich. "Microwave Amplifier Having Cross-Polarized Cavities," U.S. Patent Application 08/610, 778, filed November 3, 1998.
- [72] M. Blank, E. V. Zasyplkin, and B. Levush, "An Investigation of X-Band Gyrotwystron Amplifiers," *IEEE Trans. Plasma Sci.*, 1998, v. 26, n. 3, pp. 577–581.
- [73] C. S. Kou, M. H. Wu and Fouriers Tseng, "Nonlinear Analysis of a Multi-Cavity Gyro-twystron," *Int. J. Infrared and Millimeter Waves*, 1997, v. 18, n. 10, pp. 1857–1883.
- [74] G. S. Nusinovich, W. Chen, and V. K. Tripathi, "Linear Theory of a Gyrotwystron with Stagger-Tuned Cavities," *IEEE Trans. Plasma Sci.*, 1998, v. 26, n. 3, pp. 468–474.
- [75] M. Blank, B. G. Danly, and B. Levush, "Experimental Demonstration of a W-Band 94 GHz Gyrotwystron Amplifier," *IEEE Trans. Plasma Sci.*, 1999, v. 27, n. 2, pp. 405–411.
- [76] M. Blank, K. Felch, B. G. James, P. Borchard, P. Cahalan, T. S. Chu, H. Jory, B. G. Danly, B. Levush, J. P. Calame, K. T. Nguyen, and D. E. Pershing, "Development and Demonstration of High-Average Power W-Band Gyro-Amplifiers for Radar Applications," *IEEE Trans. Plasma Sci.*, 2002, v. 30, n. 3, pp. 865–875.
- [77] M. Blank, P. Borchard, S. Cauffman, and K. Felch, "Development and Demonstration of Broadband W-Band Gyro-Amplifiers for Radar Applications," *Infrared and Millimeter Waves, 2007 and the 2007 15th International Conference on Terahertz Electronics. IRMMW-THz. Joint 32nd International Conference on*, vol. 4, no. 13, pp. 364–366, 2007.

- [78] R. Ngogang, G. S. Nusinovich, T. M. Antonsen, and V. L. Granatstein, "Wave interaction in relativistic harmonic gyro-traveling-wave devices," *Physical Review E*, 2006, v. 73, n. 5, pp. 1–11.
- [79] K. Chang, M. A. Pollock, M. K. Skrehot, G. Dickey, and J. Suddath, "System Feasibility Study of a Microwave/Millimeter-Wave Radar for Space Debris Tracking," *Int. J. Infrared and Millimeter Waves*, 1989, v. 10, n. 1, pp. 1–19.
- [80] Alexei A. Tolkachev, B. A. Levitan, G. K. Solovjev, V. V. Veytsel, and V. E. Farber, "A Megawatt Power Millimeter-Wave Phased-Array Radar," *IEEE AES Syst. Mag*, 2000, v. 15, n. 7, pp. 25–32.
- [81] G. J. Linde, M. T. Ngo, B. G. Danly, W. J. Cheung, and V. Gregers-Hansen, "WARLOC: A High-Power Coherent 94 GHz Radar," *IEEE Trans. Aerospace Electronic Systems*, 2008 , v. 44, n. 3, pp. 1102–1117.
- [82] M. Blank, B. G. Danly and B. Levush, "Circuit Design of a Wideband W-Band Gyrokylystron Amplifier for Radar Applications," *IEEE Trans. Plasma Sci*, 1998, v. 26, n. 3, pp. 426–432.
- [83] M. E. MacDonald, J. P. Anderson, R. K. Lee, D. A. Gordon, and G. N. McGrew, "The HUSIR W-band transmitter," *Lincoln Lab. J.*, vol. 21, pp. 106–114, 2014.
- [84] W. Lawson, R. L. Ives, M. Mizuhara, J. M. Neilson, and M. E. Read, "Gyrokylystron for Advanced Accelerator Applications," *IEEE Trans. Plasma Sci.*, 2001, v. 29, n. 3, pp. 545–558.
- [85] L. Wang, K. Dong, J. Wang, Y. Luo, W. He, A. W. Cross, K. Ronald, and A. D. R. Phelps, "Design of a Ka-Band MW Level High Efficiency Gyrokylystron for Accelerators," *2017 10th UK-Europe-China Workshop on Millimetre Waves and Terahertz Technologies, UCMMT 2017*, vol. 12, pp. 1752–1757, 2017.
- [86] Arne W. Fliflet, "Linear and Non-Linear Theory of the Doppler-Shifted Cyclotron Resonance Maser based on TE and TM Waveguide Modes." *International Journal Electronics Theoretical Experimental*, 1986, v. 61, n. 6, pp. 1049-1080.
- [87] A. W. Fliflet, R. C. Lee, S. H. Gold, W. M. Manheimer, and E. Ott, "Time-Dependent Multimode Simulation of Gyrotron Oscillators." *Phys. Rev. A*, 1991, v. 43, pp. 6166-6176.
- [88] B. N. Basu, *Electromagnetic Theory and Applications in Beam-Wave Interactions*, Singapore: World Scientific, 1995.
- [89] Pavel Winternitz, Kurt Bernardo Wolf, George S. Pogosyan, and A. N. Sissakian, "Graf's Addition Theorem Obtained from SO(3) Contraction," *Theo. math. phys.*, 2001, v.129, n. 2 pp. 1501-1503.
- [90] M. V. Swati, M. S. Chauhan, and P. K. Jain, "Time-Dependent, Multimode Interaction Analysis of the Gyrokylystron Amplifier," *Phys. Plasmas*, 2016, v. 23, n. 8 pp. 083124.
- [91] Q. S. Wang, J. R. Luo, S. Y. Peng, and C. Q. Jiao, "A Steady-State Multimode Analysis of Mode Competition in Gyro-TWT," *14th IEEE International Vacuum Electronics Conference, IVEC 2013 - Proceedings*, no. 5, pp. 1–2, 2013.

- [92] T. M. Antonsen, Jr., A. A. Mondelli, B. Levush, J. P. Verboncoeur, and C. K. Birdsall, “Advances in Modeling and Simulation of Vacuum Electronic Devices,” *Proc. IEEE*, 1999, v. 87, n. 5, pp. 804–839.
- [93] B. Levush, A. Vlasov, I. Chernyavskiy, S. Cooke, J. Pasour, G. Stantchev, K. Nguyen, E. Wright, D. Chernin, J. Petillo, and T. Antonsen, “Modeling and Simulation of Millimeter Wave Vacuum Electronic Devices at the Naval Research Laboratory,” *2015 IEEE International Conference on Microwaves, Communications, Antennas and Electronic Systems, COMCAS 2015*, v. 1, n. November, pp. 1–4, 2015.
- [94] G. A. E. Vandenbosch and A. Vasylchenko, “A practical guide to 3D electromagnetic software tools,” in *Microstrip Antennas*, N. Nasimuddin, Ed. Hertfordshire, U.K.: InTech, pp. 507–540, 2011.
- [95] HFSS, Ansoft Ansys, User’s manual, 2014.
- [96] CST Studio Suite—User’s Manual, *Comput. simul. technol.*, Darmstadt, Germany, 2014.
- [97] XFDTD 3D Electromagnetic Simulation Software, <https://www.remcom.com/xfdtd-3d-em-simulation-software>.
- [98] COMSOL Multiphysics. (2016) Introduction to COMSOL Multiphysics, COMSOL Inc., MA, 639 USA. Available: <http://www.comsol.com>.
- [99] B. Goplen, L. Ludeking, and D. Smithe, MAGIC User’s Manual. Newington, VA: Mission Research Corp., 1996, vol. MRC/WDC-R-380.
- [100] VSIM Reference Manual, TechX \a href="https://www.txcorp.com/vsim">https://www.txcorp.com/vsim.
- [101] K. P. Artyomov, V. V. Ryzhov, G. A. Naumenko, and M. V. Shevelev, “PIC Code KARAT Simulation of Different Types Of Polarization Radiation Generated By Relativistic Electron Beam,” *Journal of Physics: Conference Series*, 2012, v. 357, n. 1, pp. 1-8.
- [102] M. Z. M. Clemens, S. Drobny, H. Krugert, P. Pindert, Podebrad, B. Schillinger*, B. Trapp, T. Weiland, M. Wilke, M. Bartsch, U. Becker, “The Electromagnetic Simulation Software Package MAFIA 4,” pp. 565–568.
- [103] A. S. Singh, S. Yuvaraj, and M. Thottappan, “Analytical and PIC Simulation Studies of a Megawatt Class Gyrotwystron Amplifier,” *IEEE Trans. Electron Devices*, 2016, vol. 63, no. 10, pp. 4104–4112.,
- [104] C. S. Kou, Q. S. Wang, D. B. McDermott, A. T. Lin, K. R. Chu, N. C. Luhmann Jr., "High-Power Harmonics Gyro-TWT Part I: Linear Theory and Oscillation Study", *IEEE Trans. Plasma Sci.* , 1992, v. 20, n. 3, pp. 155-162.
- [105] V. Kesari, P. K. Jain, and B. N. Basu, “Analysis of a Circular Waveguide Loaded with Thick Annular Metal Discs for Wide-Band Gyro-TWTs,” *IEEE Trans. Plasma Sci.*, 2005, v. 33, n. 4, pp. 1358–1365.
- [106] H. H. Song, “Calculation of Start-Oscillation-Current for Lossy Gyro-TWT Using Linear TWT Parameter Conversions,” *J. Electromagn. Anal. Appl.*, 2013, v. 5, pp. 1–4.

- [107] Y. Tang et al., "Multimode Steady-State Analysis for a Gyrotron Traveling Wave Amplifier Based on a Distributed Loss-Loaded Metal Cylindrical Waveguide," *IEEE Trans. Electron Devices*, 2017, v. 64, n. 2, pp. 543–549.
- [108] V. Kesari, P. K. Jain, and B. N. Basu, "Approaches to the Analysis of a Disc-Loaded Cylindrical Waveguide for Potential Application in Wide-Band Gyro-TWTs," *IEEE Trans. Plasma Sci.*, 2004, v. 32, n. 5, pp. 2144–2151.
- [109] A. S. Singh and M. Thottappan, "Stability Study in Dielectric Ring Loaded Periodic Interaction Structure for a Megawatt Class Gyrotwystron," *IEEE Trans. Electron Devices*, 2018, v. 65, n. 10, pp. 4585–4591.
- [110] A. H. McCurdy and J. J. Choi, "Design and Analysis of a Coaxial Coupler for a 35 GHz Gyroklystron Amplifier," *IEEE Trans. Microw. Theory Tech.*, 1999, v. 47, n. 2, pp. 164–175.
- [111] M. Thumm, "Development of Output Windows for High-Power Long-Pulse Gyrotrons and EC Wave Applications," *Int. J. Infrared Millim. Waves*, 1998, v. 19, pp. 3–14.
- [112] W. B. Herrmannsfeldt, "An electron optics and gun design program," *Linear Accelerator Center, Stanford, CA, SLAC Rep.*, p. 331, 1998.
- [113] M. E. Read, W. G. Lawson, A. J. Dudas, and A. Singh, "Depressed Collectors for High-Power Gyrotrons," *IEEE Trans. Electron Devices*, 1990, v. 37, n. 6, pp. 1579–1589.

AUTHOR'S RELEVANT PUBLICATIONS

International Journals

Anshu S. Singh, S. Yuvaraj and M. Thottappan, "Analytical and PIC Simulation Studies of a Megawatt Class Gyrotwystron Amplifier," *IEEE Transactions on Electron Devices*, vol. 63, no. 10, pp. 4104-4112, Oct. 2016.

Anshu S. Singh and M. Thottappan, "Stability Study in Dielectric Ring Loaded Periodic Interaction Structure for a Megawatt Class Gyrotwystron," *IEEE Transactions on Electron Devices*, vol. 65, no. 10, pp. 4585 - 4591, Oct. 2018.

Anshu S. Singh and M. Thottappan, "RF Coupling and Beam-Wave Interaction Study in a Periodically Loaded X-band 25-MW Gyro-twystron," *IEEE Transactions on Electron Devices*, vol. 65, no. 11, pp. 5089-5096, Nov. 2018.

International Conferences

Anshu S. Singh and M. Thottappan, "Design and PIC Simulation of a Stagger Tuned Gyro-twystron," *2016 Progress in Electromagnetic Research Symposium (PIERS)*, Shanghai, China, pp. 4810-4813. **(Oral presentation)**

Anshu S. Singh and M. Thottappan, "Design and PIC Simulation of A Mega-watt Class Gyro-twystron," *2016 Progress in Electromagnetic Research Symposium (PIERS)*, Shanghai, China, pp. 4786-4789. **(Oral presentation)**

Anshu S. Singh, S. Chauhan and M. Thottappan, "Analytical and PIC Simulation Studies of Ka-Band Gyro-twystron Amplifier," *2016 Asia-Pacific Microwave Conference (APMC)*, New Delhi, India, pp. 1-4. **(Oral presentation)**

National Conferences

Anshu S. Singh and M. Thottappan, "Particle-in-Cell Simulation of Ka-band Gyro-twystron," *2016 National Conference on Emerging Trends in Vacuum Electronic Devices & Applications (VEDA)*, IPR Gandhinagar. **(Poster presentation)**

Anshu S. Singh and M. Thottappan, "Multimode Analysis of Periodically Loaded Gyro-twystron Amplifier," *2017 National Conference on Emerging Trends in Vacuum Electronic Devices & Applications(VEDA)*, IIT-R ROORKEE.

Anshu S. Singh and M. Thottappan, " Analysis of Pre-Bunching RF Sections for Weakly Relativistic Gyro-twystron," *2018 National Conference on Emerging Trends in Vacuum Electronic Devices & Applications(VEDA)*, IIT-G Guwahati. **(Oral presentation)**