

---

---

## REFERENCES

---

---

- Akash and Thottappan M., "Stability and multimode simulation studies of w-band uniformly dielectric-loaded gyrotron traveling-wave tube amplifier," *IEEE Trans. Electron Devices*, vol. 66, no. 12, pp. 5305-5312, Dec. 2019.
- Amboss, K., "The current art of millimeter-wave solid state and tube type power sources," *Conf. Proc., Military Microwaves*, MM-80, London, pp. 520-546, 1980.
- Andronov, A. A., Flyagin, V. A., Gaponov, A. V., Goldenberg, A. L., Petelin, M. I., Usov, V. G., and Yulpatov, V. K., "The gyrotron: high power sources of millimeter and submillimeter waves," *Infrared Physics*, Vol. 18, pp. 385-393, 1978.
- Baird, J. M., and Lawson, W., "Magnetron injection gun (MIG) design for gyrotron applications", *Int. J. Electron.*, vol. 61, pp. 953-967, 1986.
- Barker, R. J. and Schamiloglu, E. Ed., "High-Power Microwave Sources and Technologies," *New York: IEEE Press*, 2001.
- Benford J., "Space applications of high-power microwaves", *IEEE Trans. on Plasma Sci.*, vol. 36, pp. 569-581, 2008.
- Beringer, M., "Design Studies towards a 4 MW 170 GHz Coaxial-Cavity Gyrotron" PhD thesis, Karlsruhe Institut für Technologie (KIT), 2010.
- Blank, M., B. G. Danly, and B. Levush, "Experimental demonstration of a W-band (94 GHz) gyro-twystron amplifier," *IEEE Trans. on Plasma sci.*, vol. 27, no. 2, pp. 405-411, 1999.
- Blank, M., Cahalan, P., Felch, K., Danly, B., Levush, B., Pershing, D., Nguyen, K., and Calame, J., "Demonstration of a wide-band 94 GHz gyrotwystron amplifier," *IEEE International Conference on Plasma Science*, pp. 256, 2003.
- Blank, M., K. Felch, B. James, P. Borchard, P. Cahalan, T. Chu, H. Jory, B. G. Danly, B. Levush, and J. Calame, "Development and demonstration of high-average power W-band gyro-amplifiers for radar applications," *IEEE Trans. on Plasma Sci.*, vol. 30, no. 3, pp. 865-875, 2002.
- Blumenthal, G. R., and Gould, R. J., "Bremsstrahlung, Synchrotron Radiation, and Compton Scattering of High-Energy Electrons Traversing Dilute Gases", *Rev. Mod. Phys.*, vol. 42, no. 2, pp. 237-270, 1970.
- Bonifazi, C., Ruggieri, M., and Paraboni, A., "The DAVID Mission in the Heritage of SIRO and ITALSAT Satellites," *IEEE Trans. Aerospace Electron Syst.*, 38, pp.1371-1376, (2002).
- Bratman, V.L., Cross, A., G. Denisov, He, W., Phelps, A., Ronald, K., Samsonov, S., Whyte, C., and Young, A., "High-gain wide-band gyrotron traveling wave amplifier with a helically corrugated waveguide," *Phys. Rev. Lett.* vol. 84, no. 12, pp. 2746-2749, 2000.
- Burt, G., Samsonov, S. V., Phelps, A. D., Bratman, V. L., Ronald, K., Denisov, G. G., He, W., Young, A., Cross, A. W., and Konoplev, I. V., "Microwave pulse compression using a helically corrugated waveguide," *IEEE Trans. Plasma Sci.*, vol. 33, no. 2, pp 661-667, Feb. 2005.

- Burt, G., Samsonov, S. V., R., Ronald, Denisov, G. G., Young, A. R., Bratman, V. L., Phelps, A. D. R., Cross, A. W., Konoplev, I. V., He, W., Thomson, J., and Whyte, C. G., "Dispersion of helically corrugated waveguides: Analytical, numerical, and experimental study," *Phys. Rev. E*, vol. 70, no. 4, p. 046402, 2004.
- C. R. Donaldson W. He L. Zhang A. W. Cross "A W-band multi-layer microwave window for pulsed operation of gyro-devices" *IEEE Microw. Wireless Compon. Lett.* vol. 23 no. 5 pp. 237-239 May 2013.
- C.-F. Yu and T.-H. Chang, "High-performance circular  $TE_{01}$ -mode converter," *IEEE Trans. Microw. Theory Techn.*, vol. 53, no. 12, pp. 3794–3798, Dec. 2005.
- C.H. Du, T.H. Chang, P.K. Liu, Y.C. Huang, P.X. Jiang, S.X. Xu, Z.H. Geng, B.L. Hao, L. Xiao, G.F. Liu, and Z. Di Li, "Design of a W-band gyro-TWT amplifier with a lossy ceramic-loaded circuit". *IEEE Trans. Electron Devices*, vol. 60, no. 7, pp. 2388–2394, Jul. 2013.
- Calame, J. P., Garven, M., Danly, B. G., Levush, B., and Nguyen, K. T., "Gyrotron-traveling wave-tube circuits based on lossy ceramics", *IEEE Trans. Electron Devices*, vol. 49, no. 8, pp. 1469–1477, 2002.
- Chiu, C., C. Tsai, S. Kao, K. Chu, L. Barnett, and N. Luhmann Jr, "Study of a high order-mode gyrotron traveling-wave amplifier," *Physics of Plasmas*, vol. 17, no. 11, pp. 113104-113109, 2010.
- Chong, C. K., McDermott, D. B., Lin, A. T., Hope, W. J., Wang, Q. S., and Luhmann, N. C., "Stability of a 95-GHz slotted third-harmonic gyro-TWT amplifier," *IEEE Trans. Plasma Sci.*, vol. 24, no. 3, pp. 735-743, June 1996.
- Chong, C. K., McDermott, D., and Luhmann Jr, N., "Large-signal operation of a third-harmonic slotted gyro-TWT amplifier," *IEEE Trans. on Plasma Sci.*, vol. 26, no. 3, pp. 500-507, 1998.
- Choon Sae Lee, Shung-Wu Lee and Shun-Lien Chuang, "Normal Modes in an Overmoded Circular Waveguide Coated with Lossy Material," *IEEE Trans. Microw. Theory Techn.*, vol. 34, no. 7, pp. 773-785, Jul 1986.
- Chu KR, "Overview of research on the gyrotron traveling-wave amplifier," *IEEE Trans. Plasma Sci.*, vol. 30, pp. 903–908, 2002.
- Chu, K. R., "Theory of electron cyclotron maser interaction in a cavity at the harmonic frequencies," *Phys. Fluids*, vol. 21, pp. 2354-2364, 1978.
- Chu, K. R., L. R. Barnett, W. K. Lau, L. H. Chang, and C. S. Kou, "Recent developments in millimeter wave gyro-TWT research at NTHU," *Electron Devices Meeting*, 1990, pp. 699-702.
- Chu, K. R., L. R. Barnett, W. K. Lau, L. H. Chang, and H. Y. Chen, "A wide-band millimeter-wave gyrotron traveling-wave amplifier experiment," *IEEE Trans. on Electron Devices*, vol. 37, no. 6, pp. 1557-1560, 1990.
- Chu, K., H. Chen, C. Hung, T. Chang, L. Barnett, S. Chen, and T. Yang, "Ultrahigh gain gyrotron traveling wave amplifier," *Phys. Rev. Lett.*, vol. 81, no. 21, pp. 4760-4763, 1998.
- Chu, K., L. Barnett, H. Chen, S. Chen, C. Wang, Y. Yeh, Y. Tsai, T. Yang, and T. Dawn, "Stabilization of absolute instabilities in the gyrotron traveling wave amplifier," *Phys. Rev. Lett.*, vol. 74, no. 7, pp. 1103-1106, 1995.

- Chu, K.R., "The electron cyclotron maser", *Reviews of Modern Physics*, vol. 76, no. 2, pp. 489-540, 2004.
- Chu, K.R., Chen, H.Y., Hung, C.L., Chang, T.H., Barnett, L.R., Chen, S.H., Yang, T.T. and Dialetis, D.J., "Theory and experiment of ultrahigh-gain gyrotron traveling wave amplifier", *IEEE Trans. Plasma Sci.*, vol. 27, no. 2, pp. 391–404, Apr. 1999.
- Clark D.E. and Sutton W.H., "Microwave processing of materials", *Annual Review of Materials Science*, 26, pp. 299-331, 1996.
- Collin, R. E., *Foundations for Microwave Engineering*, New York: McGraw-Hill, 1966.
- Cooke, S. J., and Denisov, G. G., "Linear theory of a wide-band gyro-TWT amplifier using spiral waveguide," *IEEE Trans. Plasma Sci.*, vol. 26, no. 3, pp. 519–530, Mar. 1998.
- Cross, A. W., He, W., Phelps, A. D. R., Ronald, K., Whyte, C. G., Young, A. R., Robertson, C. W. Robertson, Rafferty, E. G., and Thomson, J., "Helically corrugated waveguide gyrotron traveling wave amplifier using a thermionic cathode electron gun," *Appl. Phys. Lett.*, vol. 90, p. 253501, 2007.
- CST-Particle Studio, User's Manual, Darmstadt, Germany, 2017.
- Danly, B. G., Cheung, J., Gregers, V. H., "WARLOC: a high-power millimeter wave radar" In: 27th international conference on infrared and millimeter waves, 22–26 Sept 2002. Conference digest, SANDIEGO, CA, USA.
- Denisov, G. G., Bratman, V. L., Cross, A., He, W., Phelps, A., Ronald, K., Samsonov, S., and Whyte, C., "Gyrotron traveling wave amplifier with a helical interaction waveguide," *Phys. Rev. Lett.* vol. 81, no. 25, pp. 5680-5683, 1998.
- Denisov, G. G., Bratman, V. L., Phelps, A. D., and Samsonov, S. V., "Gyro-TWT with a helical operating waveguide: New possibilities to enhance efficiency and frequency bandwidth," *IEEE Trans. on Plasma Sci.*, vol. 26, no. 3, pp. 508-518, 1998.
- Diaz, N.; Casraneda, S.; Ripalda, J.M.; Montero, I.; Galan, L.; Feltham, S.; Rabosa, D.; Rueda, F., "Materials of low secondary electron emission to prevent the multipactor effect in high-power RF devices in space," In Proceedings of the 6th Spacecraft Charging Conference, Hanscom AFB, MA, USA, 2–6, Nov 1998; vol. 1, pp. 205–209.
- Du, C. H., and Liu, P. K., "Linear Full-Wave-Interaction Analysis of a Gyrotron-Traveling-Wave-Tube Amplifier Based on a Lossy Dielectric-Lined Circuit," *IEEE Trans. on Plasma Sci.*, vol. 38, no. 6, pp. 1219-1226, June 2010.
- Du, C. H., and Liu, P. K., "Nonlinear full-wave-interaction analysis of a gyrotron-traveling-wave-tube amplifier based on a lossy dielectric-lined circuit" *Phys. Plasmas* vol. 17 no. 3 pp. 033104 Mar. 2010.
- Du, C. H., and Liu, P. K., "Stability study of a gyrotron-traveling-wave amplifier based on a lossy dielectric-loaded mode-selective circuit" *Phys. Plasmas* vol. 16 no. 7 pp. 073104, Jul. 2009.
- Du, C. H., and Liu, P. K., "Beam-wave coupling strength analysis in a gyrotron traveling-wave amplifier," *J. Infr. Millim. Terahertz Waves*, vol. 31, no. 6, pp. 714–723, June 2010.
- Du, C. H., and Liu, P. K., *Millimeter-Wave Gyrotron Traveling-Wave Tube Amplifiers*, Springer-Verlag, Berlin, Heidelberg, 2014.

- Du, C. H., and Liu, P. K., Xue, Q. Z., and Wang, M. H., "Effect of a backward-wave on the stability of an ultrahigh gain gyrotron traveling-wave amplifier", *Phys. Plasmas*, vol. 15, no. 12, pp. 123107-8, Dec. 2008.
- Du, C.H., Liu, P.K., "A lossy dielectric-ring loaded waveguide with suppressed periodicity for gyro-TWTs applications," *IEEE Trans. Electron Devices*, vol. 5 no. 6, pp. 2335–2342, 2009.
- Eckstein, J., D. Latshaw, and D. Stone, "GHz gyro traveling wave tube, VARIAN Assoc., Final Rep," Contract DASG60-79-C-005 MOD P, vol. 3, 1995.
- Felch, K. L., Danly, B. G., Jory, H. R., Kreischer, K. E., Lawson, W., Levush, B., and Temkin, R. J., "Characteristics and applications of fast-wave gyrodevices," *Proc. IEEE*, vol. 87, pp. 752-781, 1999.
- Fukui, H., Machida, T., Kanamoto, T. and Tsutaki, K., "Development of Ka-band 250W peak power helix TWT". In Third IEEE International Vacuum Electronics Conference (IEEE Cat. No.02EX524), pp 355–356, April 2002.
- Galati, G., Ferri, M., Mariano, P., and Marti, F., "Advanced Integrated Architecture for Airport Ground Movements Surveillance," *Record of the IEEE International Radar Conference*, pp. 282-287, 1995.
- Gaponov, A. V., and Granatstein, V. L., Ed., "Application of High-Power Microwaves," Boston: Artech House, 1994.
- Garate, E. P., Fisher, A., and Main, W. G., "Coaxial Configuration of the Dielectric Cerenkov Maser", *IEEE Trans. Plasma Sci.*, vol. 18, no. 5, pp. 831-836, 1990.
- Garven, M., Calame, J. P., Danly, B. G., "A gyrotron-traveling-wave tube amplifier experiment with a ceramic loaded interaction region," *IEEE Trans. Plasma Sci.*, vol. 30, no. 3, pp. 885-893, June 2002.
- Gilmour, A. S. Jr., *Microwave Tubes*, Boston: Artech House, 1986.
- Glyavin, M. Y., Luchinin, A. G., and Golubiantnikov, G. Y., Generation of 1.5-kW 1-Thz Coherent radiation from a gyrotron with a pulsed magnetic field, *Phys. Rev. Lett.* vol.100, pp 015101, 2008.
- Granatstein, V. L., and I. Alexeff, "High-power microwave sources," Artech House Publishers, 1987.
- Granatstein, V.L., Levush, B., Danly, B.G. and Parker, R.K., "A quarter century of gyrotron research and development" *IEEE Trans. on Plasma Sci.*, vol. 25, no. 6, pp. 1322-1335, 1997.
- H. Guo, D. S. Wu, G. Liu, Y. H. Miao, S. Z. Qian and W. Z. Qin, "Special complex open-cavity and low-magnetic-field high-power gyrotron," *IEEE Trans. Plasma Sci.*, vol. 18, no. 3, pp. 326-333, June 1990.
- Happek, U., and Sievers, A. J., "Observation of Coherent Transition Radiation", *Phys. Rev. Lett.* 67, vol. 67, no. 21, pp. 2962-2965, 1991.
- He, W., Donaldson C.R., Zhang L, Ronald K, Phelps, A. D. R., and Cross A.W., "Broadband amplification of low-terahertz signals using axis-encircling electrons in a helically corrugated interaction region" *Phys. Rev. Lett.* vol. 119 no. 18 pp. 184801 Nov. 2017.

- He, W., Donaldson, C.R., Zhang, L., Ronald, K., McElhinney, P., Cross, A. W., High power wideband gyrotron backward wave oscillator operating towards the terahertz region. *Phys Rev Lett.* vol. 110 no. 16 p:165101, 2013.
- He, W., Phelps, A., Cross, A., Donaldson, C. R., and Ronald, K., "A W-band gyrotron travelling wave amplifier using a helically corrugated waveguide," *2008 17th International Conference High Power Particle Beams (BEAMS)*, Xian, 2008, pp. 1-3.
- Idehara, T., Saito, T., Ogawa, I., Mitsudo, S., Tatematsu, Y., Agusu, L, M, H., and Kobayashi, S., "Development of Terahertz FU CW Gyrotron Series for DNP", *Applied Magnetic Resonance*, vol. 34, pp. 3-4, August, 2008.
- J. H. Booske *et al.*, "Vacuum electronic high-power terahertz sources," *IEEE Trans. Terahertz Sci. Technol.*, vol. 1, no. 1, pp. 54–75, Sep. 2011.
- Jawla, S., Ni, Q.Z., Barnes, A. *et al.* Continuously Tunable 250 GHz Gyrotron with a Double Disk Window for DNP-NMR Spectroscopy. *J Infrared Milli. Terahz. Waves* vol. 34, pp. 42–52, 2013.
- Jebril, A., Fragale, C., Lucente, M., Ruggieri, M., and Rossi, T., "WAVE – A new satellite mission in W-band," *Proc. IEEE Aerospace Conference*, Big. Sky, USA, paper no. 1007, 2005.
- K. R. Chu and A. T. Lin, "Gain and bandwidth of the gyro-TWT and CARM amplifiers," *IEEE Trans. Plasma Sci.*, vol. 16, no. 2, pp. 90-104, April 1988.
- Kartikeyan, M. V., Borie, E., and Thumm, M. K. A., *Gyrotrons High-Power Microwave and Millimeter Wave Technology*, Germany: Springer, 2004.
- Katsenelenbaum, B. Z., D. Ro, L. M., Pereyaslavets, M., Ayza, M. S., and Thumm, M., *Theory of Non-Uniform Waveguides: The Cross- Section Method*. London, U.K.: The IET, 1999.
- Kempkes, M. A. Hawkey T. J., Gaudreau, M. P. J., and Phillips, R. A., "W-band transmitter upgrade for the Haystack ultra-wideband satellite imaging radar (HUSIR)". In 2006 IEEE International Vacuum Electronics Conference held Jointly with 2006 IEEE International Vacuum Electron Sources, pp. 551–552, 2006.
- Kesari, V., and Keshari, J . P., "Analysis of a circular waveguide loaded with dielectric and metal discs," *Prog. Electromagn. Res.*, vol. 111, pp. 253–269, Jan. 2011.
- Kesari, V., Singh, A. K., Seshadri, R. and Kamath, S., "Boron Nitride and Sapphire Windows for 95-GHz Gaussian RF Beam," *IEEE Trans. Electron Devices*, vol. 63, no. 8, pp. 3257-3261, Aug. 2016.
- Kou, C. S., Wang, Q. S., McDermott, D. B., Lin A. T., Chin K. R., and Luhmann N . C., "High-power harmonic gyro-TWT's. I. Linear theory and oscillation study," *IEEE Trans. Plasma Sci.*, vol. 20, no. 3, pp.155-162, June 1992.
- Kou, C. S., Wu, M. H., and Tseng, F., "Nonlinear analysis of a multi-cavity gyro-twystron." *Int J Infrared Milli Waves*, vol. 18 no.10, pp. 1857-1883, 1997.
- Kumar, N., Singh, U., Kumar, A., Sinha, A.K., "Design of 95 GHz, 100 kW gyrotron active denial system application" *Vacuum*, 99., pp. 99-106, Jan. 2014
- L. R. Barnett, J. Baird, Y. Lau, K. Chu, and V. Granatstein, "A high gain single stage gyrotron traveling-wave amplifier," *Electron Devices Meeting*, pp. 314-317, 1980.

- L. R. Barnett, K. Chu, J. M. Baird, V. Granatstein, and A. Drobot, "Gain, saturation, and bandwidth measurements of the NRL gyrotron travelling wave amplifier," *Electron Devices Meeting*, pp. 164-167, 1979.
- L. Zhang, Donaldson, C. R., Cain P., Cross, A. W., and He, W., "Amplification of frequency-swept signals in a W-band gyrotron travelling wave amplifier," *IEEE Electron Device Letters*, vol. 39, no. 7, pp. 1077-1080, July 2018.
- Lau, Y., K. Chu, L. Barnett, and V. Granatstein, "Gyrotron travelling wave amplifier: I. Analysis of oscillations," *Int J Infrared Milli Waves*, vol. 2, no. 3, pp. 373-393, 1981.
- Lau, Y., K. Chu, L. Barnett, and V. Granatstein, "Gyrotron travelling wave amplifier: II. Effects of velocity spread and wall resistivity," *Int J Infrared Milli Waves*, vol. 2, no. 3, pp. 395-413, 1981.
- Leou, K., D. McDermott, and N. Luhmann, "Large-signal characteristics of a wide-band dielectric-loaded gyro-TWT amplifier," *IEEE Trans. Plasma Sci.*, vol. 24, no. 3, pp. 718-726, 1996.
- Leou, K.C., "Theoretical and experimental study of a dielectric-loaded wideband gyro-TWT," Ph.D. Thesis, University of California, 1994.
- LeVine, S., "The Active Denial System A Revolutionary, Nonlethal Weapon for Today's Battlefield," Technical Report, Center for Technology and National Security Policy (National Defense University, Washington DC, 2009.
- Li, H., Wang, J., Yao, Y., Dong, K., Jiang, W., Xu, Y. and Luo, Y., "Design and Simulation of a Broadband Ka-Band Gyrotron Traveling-Wave Tube with a Fully Dielectric-Loaded Circuit," *IEEE Trans. Electron Devices*, vol. 65, no. 5, pp. 1969-1975, May 2018.
- Lin, A. T., Chu, K. R., Lin, C. C., Kou, C. S., McDermott, D. B., and Luhmann. Jr., N. C. "Marginal stability design criterion for Gyro-TWT's and comparison of fundamental with second harmonic operation," *Int. J. Electron.* vol. 72, pp. 873-885, 1992.
- Linde, G.J., Ngo M.T., Danly, B.G., "WARLOC: a high-power coherent 94 GHz radar", *IEEE Trans. Aerosp. Electron Syst.*, vol.44, pp. 1102-1117, 2008.
- Liu, B., Feng, J., Wang, E., Li, Z., Zeng, X., Qian, L. and Wang, H., "Design and experimental study of a Ka-band gyro-TWT with periodic dielectric loaded circuits," *IEEE Trans. Plasma Sci.*, vol. 39, no. 8, pp. 1665-1672, Aug. 2011.
- M. Blank, B. G. Danly, B. Levush, "Experimental demonstration of W-band gyrokystron amplifiers with improved gain and efficiency". *IEEE Trans Plasma Sci.*, vol. 28, pp 706-711, 2000.
- M. Lin "A Multilayer Waveguide Window for Wide- Bandwidth Millimeter Wave Tubes," *Int J Infrared Milli Waves*, vol. 28, pp. 355-362, 2007.
- McDermott, D. B., Song, H. H., Hirata, Y., Lin, A. T., Barnett, L., Chang, T., Hsu, H. L., P. S., Marandos, J. L., and Chu, K. R., "Design of a W-band TE<sub>01</sub> mode gyrotron traveling-wave amplifier with high power and broad-band capabilities," *IEEE Trans. Plasma Sci.*, vol. 30, no. 3, pp. 894-902, 2002.
- McDonald, M. E., Anderson, J. P., Lee, R. K., Gordon, D. A., McGrew, G. N., "The HUSIR W-band transmitter" *Lincoln Lab. J.* vol. 21 pp. 106-114 2014.

- Menninger, W. L., Eze, D. C., Hollister, R. S., and Martin, R. H., "High-efficiency, 200-W Ku-band traveling-wave tubes for satellite communications downlinks" In 2013 IEEE 14th International Vacuum Electronics Conference (IVEC), pages 1–2, May 2013.
- Nanni, E. A., "Design of a 250 GHz Gyrotron Amplifier", *M.S. thesis*, MIT, 2010.
- Neilson, J., Read, M., Ives, L., "Design of a permanent magnet gyrotron for active denial systems". In: 34th international conference on infrared, millimeter, and terahertz waves (IRMMW-THz 2009), 21–25 Sept 2009, Busan, Korea.
- Nguyen K.T., Calame J.P., Pershing D.E., Danly, B. G., Garven, M., Levush, B., and Antonsen, T., "Design of a Ka-band gyro-TWT for radar applications," *IEEE Trans. on Electron Devices*, vol. 48, no. 1, pp. 108-115, 2001.
- Osepchuk J. M., "A history of microwave-heating applications", *IEEE Trans. Microw. Theory Techn.*, vol. 32, no. 9, pp. 1200-1224, 1984.
- Osepchuk J. M., 2009, "The History of the Microwave Oven: A Critical Review", *2009 IEEE/MTT-S International Microwave Symposium*, New York, pp. 1397-1400.226.
- P. Sprangle and A.T. Drobot, "Linear and self-consistent nonlinear theory of the electron cyclotron maser instability", *IEEE Trans. Microw. Theory Techn.*, vol. 25, no. 6, pp. 528-544, 1977.
- Park, G. S., Choi, J. J., Park, S. Y., Armstrong, C. M., Ganguly, A. K., Kyser, R. H., Parker, R. K., "Gain broadening of two-stage gyrotron traveling wave tube amplifier" *Phys. Rev. Lett.* vol. 74, pp. 2399-2402, 1995.
- Pershing D. E., Nguyen K.T., Calame J.P., "A TE<sub>11</sub> Ka-band gyro-TWT amplifier with high-average power compatible distributed loss", *IEEE Trans. Plasma Sci.*, vol. 32, pp 947–956, 2004.
- Piosczyk, B., Arnold, A., Budig, H., Dammertz, G., Dumbrajs, O., Drumm, O., Kartikeyan, M.V., Kuntze, M., Thumm, M. and Yang, X., "Towards a 2 MW, CW, 170 GHz coaxial cavity gyrotron for ITER". *Fusion Engineering and Design*, vol. 66, pp 481-485, 2003.
- Piosczyk, B., Dammertz, G., Dumbrajs, O., etc., "A 2 MW, 170 GHz coaxial cavity gyrotron experimental verification of the design of main components," *3rd IAEA Technical Meeting on ECRH Physics and Technology in ITER*. 2005.
- Piosczyk, B., Iatrou, C. T., Dammertz, G. and Thumm, M., "Single-stage depressed collectors for gyrotrons," *IEEE Trans. Plasma Sci.*, vol. 24, no. 3, pp. 579-585, June 1996.
- RF Harrington, "Time-harmonic electromagnetic fields" Wiley / IEEE Press, Piscataway, ISBN0-471-20806-X, John Wilson, Inc, 605 Third Avenue, New York, 2001.
- Robertson, C. W., Young, A. R., Ronald, K., Cross, A. W. and Whyte, C. G., "Circular polariser for use in a gyro-travelling wave amplifier," *IET Microwaves, Antennas & Propagation*, vol. 7, no. 11, pp. 942-948, 20 August 2013.
- Samsonov, S. V., A. A. Bogdashov, I. G. Gachev, G. G. Denisov, and S. V. Mishakin, "Proof-of-Principle Experiment on High-Power Gyrotron Traveling-Wave Tube with a Microwave System for Driving and Extracting Power Through One Window," *IEEE Microw. Wireless Compon. Lett.* vol. 26, no. 4, pp. 288-290, 2016.

- Samsonov, S. V., Denisov, G. G., Gachev, I. G., and Bogdashov, A. A., "CW Operation of a W-Band High-Gain Helical-Waveguide Gyrotron Traveling-Wave Tube," *IEEE Electron Device Letters*, vol. 41, no. 5, pp. 773-776, May 2020.
- Seftor, J., V. Granatstein, K. Chu, P. Sprangle, and M. Read, "The electron cyclotron maser as a high-power traveling wave amplifier of millimeter waves," *IEEE Journal of Quantum Electron.*, vol. 15, no. 9, pp. 848-853, 1979.
- Sirigiri J. R., Kreischer, J., Mastovsky, M. I., Shapiro, M. A., and Temkin, R. J., "Photonic Band Gap Resonator Gyrotron," *Phys. Rev. Lett.*, vol. 86, pp. 5628-5631, 2001.
- Sirigiri, J. R., "Theory and design study of a novel quasi-optical gyrotron traveling wave amplifier," M.S. Thesis, Massachusetts Institute of Technology, USA, 1999.
- Sirigiri, J. R., Shapiro, M. A., and Temkin, R. J., "High-Power 140-GHz Quasioptical Gyrotron Traveling-Wave Amplifier," *Phys. Rev. Lett.*, vol. 90, no. 25, pp. 5628-5631, 2003.
- Song, H. H., McDermott, D., Hirata, Barnett, Y., L., Domier, C., Hsu, H., Chang, T., Tsai, W., Chu, K. R., and Luhmann Jr, N., "Theory and experiment of a 94 GHz gyrotron traveling-wave amplifier," *Phys. Plasmas*, vol. 11, no. 5, pp. 2935-2941, May 2004.
- Stephends, G. L., Vane, D. G., Boain, R. J., Mace, G. G., Sassen, K., Wang, Z., Illingworth, A. J., O'Connor, E. J., W. B. Rossow, S. L. Durden, S. D. Miller, R. T. Austin, A. Benedetti, and C. Mitrescu, "The CloudSat mission and the A-Train," *Bull. Amer. Meteorol. Soc.*, 83, pp. 1771-1790, 2002.
- T. M. Antonsen S. Y. Cai G. S. Nusinovich "Effect on window reflection on gyrotron operation" *Phys. Fluids B* vol. 4 no. 12 pp. 4131-4139, Aug-1992.
- Tang, Y., Luo, J., Xue, Q., Fan, Y., Wang, X., Peng, S., and Li, S., "Multimode steady-state analysis for a gyrotron traveling wave amplifier based on a distributed loss-loaded metal cylindrical waveguide," *IEEE Trans. Electron Devices*, vol. 64, no. 2, pp. 543-549, Feb. 2017.
- Tang, Y., Y. Luo, Y. Xu, and R. Yan, "Self-consistent nonlinear analysis and 3D particle-in-cell simulation of a W-band gyro-TWT," *Int. J Infrared Milli. Waves*, vol. 35, no. 10, pp. 799-812, 2014.
- Tatsukawa, T., Shirai, T., Imaizumi, T., Idehara, T., Ogawa, I., and Kanemaki, T., "Ruby ESR over a wide frequency range in millimeter wave region," *Int. J. Millim. Wave*, 19, pp. 859-874, 1998.
- Thumm, M., "State-of-the-art of high power gyro-devices and free electron masers," Karlsruhe Inst. Technol., Karlsruhe, Germany, Tech. Rep. 7693, 2017.
- Tigelis, Ioannis G., John L. Vomvoridis, and Sofia Tzima, "High-frequency electromagnetic modes in a dielectric-ring loaded beam tunnel," *IEEE Trans. plasma sci.* vol. 26, no. 3, pp. 922-930, Jun. 1998.
- Tsai, W., T. Chang, N. Chen, K. Chu, H. Song, and N. Luhmann Jr, "Absolute instabilities in a high-order-mode gyrotron traveling-wave amplifier," *Phys. Rev. E*, vol. 70, no. 5, pp. 056402-056405, 2004.
- W. B. Herrmannsfeldt, "Electron trajectory program," Stanford Linear Accelerator Center, Palo Alto, CA, SLAC Rep. 331, Oct. 1988.



- W. He, C. R. Donaldson, L. Zhang, K. Ronald, A. D. R. Phelps, and A. W. Cross, "Broadband amplification of low-terahertz signals using axis-encircling electrons in a helically corrugated interaction region," *Phys. Rev. Lett.*, vol. 119, no. 18, 2017, Art. no. 184801.
- W. Jiang, Y. Luo and R. Yan, "Numerical Design and Optimization of a Curved Collector for a Q-Band Gyro-Traveling Wave Tube," *IEEE Trans. Electron Devices*, vol. 61, no. 1, pp. 147-150, Jan. 2014.
- Wang, J., 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*, vol. 61, no. 6, pp. 1818-1823, 2014.
- Wang, Q. S., McDermott, D. B., and Luhmann, Jr., N. C., "Demonstration of marginal stability theory by a 200 kW second-harmonic gyro-TWT amplifier," *Phys. Rev. Lett.*, vol. 75, no. 23, pp. 4322-4325, 1995.
- Wang, Q. S., McDermott, D., and Luhmann Jr, N., "Demonstration of marginal stability theory by a 200-kW second-harmonic gyro-TWT amplifier," *Phys. Rev. Lett.*, vol. 75, no. 23, pp. 4322-4325, 1995.
- Wang, Q., C. Kou, D. McDermott, A. Lin, K. Chu, and N. Luhmann, "High-power harmonic gyro-TWT's. II. Nonlinear theory and design," *IEEE Trans. Plasma Sci.*, vol. 20, no. 3, pp. 163-169, 1992.
- Wang, Q., D. McDermott, C. Chong, C. Kou, K. Chu, and N. Luhmann, "Stable 1 MW, third-harmonic gyro-TWT amplifier," *IEEE Trans. Plasma Sci.*, vol. 22, no. 5, pp. 608-615, 1994.
- Wang, Q., H. Huey, D. McDermott, Y. Hirata, and N. Luhmann, "Design of a W-band second-harmonic TE<sub>02</sub> gyro-TWT amplifier," *IEEE Trans. Plasma Sci.*, vol. 28, no. 6, pp. 2232-2237, 2000.
- Xu, S., P. Liu, S. Zhang, and C. Du, "Design and simulation of a Ka-band TE<sub>11</sub> mode gyro-traveling-wave amplifier," *Int J Infrared Milli Waves*, vol. 31, no. 2, pp. 221-227, 2010.
- Yan, R., Y. Luo, G. Liu, and Y. Pu, "Design and experiment of a Q-band gyro-TWT loaded with lossy dielectric," *IEEE Trans. Electron Devices*, vol. 59, no. 12, pp. 3612-3617, 2012.
- Yan, R., Y. Tang, and Y. Luo, "Design and experimental study of a high-gain W-band gyro-TWT with non-uniform periodic dielectric loaded waveguide," *IEEE Trans. Electron Devices*, vol. 61, no.7, pp. 2564-2569, 2014.
- Yang, J., Zhang, X., Du, Y., Cai, J. and Feng, J., "Design of a Multistage Depressed Collector for W-Band Pulsed Traveling-Wave Tubes," *IEEE Trans. Electron Devices*, vol. 66, no. 9, pp. 4056-4061, Sept. 2019.
- Yeh, Y. S., Hung, C. L., Su, C. W., Wu, T. S., Shin, Y. Y., and Lo, Y. T., "W-band second-harmonic gyrotron traveling wave amplifier with distributed-loss and severed structures," *Int. J Infrared Milli. Waves*, vol. 25, no. 1, pp. 29-42, 2004.
- Yeh, Y., T. Wu, Y. T. Lo, C. Su, and S. Wu, "Stability analysis of TE<sub>01</sub> gyrotron travelling wave amplifiers," *Int. J Electron.*, vol. 90, no. 8, pp. 517-532, 2003.
- Yu, C. F., and Chang, T. H., "High-performance circular TE<sub>01</sub> mode converter" *IEEE Trans. Microw. Theory Techn.* vol. 53 no. 12 pp. 3794-3798 Dec. 2005.

Zhang, H., H. Li, H. Wang, X. Zhou, and P. Z. Du, "Nonlinear analysis of a slotted third-harmonic gyro-TWT amplifier," *Int J Infrared Milli Waves*, vol. 19, no. 11, pp. 1489-1498, 1998.

Zhang, L., He, W., Cross, A. W., Phelps, A. D. R., Ronald, K. and Whyte, C. G., "Design of an Energy Recovery System for a Gyrotron Backward-Wave Oscillator," *IEEE Trans. Plasma Sci.*, vol. 37, no. 3, pp. 390-394, Mar 2009.

Zhang, L., He, W., Donaldson, C. R., Garner, J. R., McElhinney, P., and Cross, A. W., "Design and Measurement of a Broadband Sidewall Coupler for a W-Band Gyro-TWA," *IEEE Trans. Microw. Theory Techn.*, vol 63, no. 10, pp. 3183- 3190, Oct. 2015.

Zhang, L., He, W., Ronald, K., Phelps, A. D. R., Whyte, C. G., Robertson, C. R., Young, A. R., Donaldson, C. R., and Cross, A. W., "Multi-mode coupling wave theory for helically corrugated waveguide," *IEEE Trans. Microw. Theory Techn.*, vol. 60, no. 1, pp. 1-7, Jan. 2012.

Zhang, L., S. V. Mishakin, W. He, S. V. Samsonov, M. McStravick, G. G. Denisov, A. W. Cross, V. L. Bratman, C. G. Whyte, and C. W. Robertson, "Experimental study of microwave pulse compression using a five-fold helically corrugated waveguide," *IEEE Trans. Microw. Theory Techn*, vol. 63, no. 3, pp. 1090-1096, 2015.

---

---

## AUTHOR'S RELEVANT PUBLICATIONS

---

---

### Journals:

**Akash** and M. Thottappan, "Stability and Multimode Simulation Studies of W-Band Uniformly Dielectric-Loaded Gyrotron Traveling-Wave Tube Amplifier," *IEEE Trans. Electron Devices*, vol. 66, no. 12, pp. 5305-5312, Dec. 2019, doi: 10.1109/TED.2019.2944487.

**Akash** and M. Thottappan, "Design, Beam-Wave Interaction, and Efficiency Enhancement Studies of Millimeter Wave Gyro-TWT With a Three-Stage Depressed Collector," *IEEE Trans. Plasma Sci.*, vol. 48, no. 6, pp. 1930-1935, June 2020, doi: 10.1109/TPS.2020.2978792.

**Akash** and M. Thottappan, "Design and Efficiency Enhancement Studies of Periodically Dielectric Loaded W-Band Gyro-TWT Amplifier," *IEEE Trans. Electron Devices*, vol. 67, no. 7, pp. 2925-2932, July 2020, doi:10.1109/TED.2020.2996191.

**Akash** and M. Thottappan, "Design and Simulation Investigations of W-Band Second Harmonic Periodically Dielectric Loaded Gyro-TWT Amplifier," *IEEE Trans. Plasma Sci.* (Under Review).

R. K. Singh, **Akash** and M. Thottappan, "Design and Simulation Investigation of High-Power Millimeter-Wave Gyrotron," *Journal of Electromagnetic Waves and Applications*. vol. 34, pp. 744-758. 10.1080/09205071.2020.1750974.

### Conferences (International):

**Akash** and M. Thottappan, "RF Propagation Characteristics of Y-shaped Coupler for Millimeter-Wave Gyro-TWT" *URSI- Regional conference on Radio Science (RCRS) 2020*, IIT-BHU, Varanasi, India.

**Akash** and M. Thottappan, "Input / Output system for Millimeter Wave Gyro-TWT" 2019 *IEEE MTT-S International Microwave and RF Conference (IMaRC)*, IIT Mumbai, Mumbai, India.

**Akash** and M. Thottappan, "Design and Simulation of W-band Second Harmonic Periodically Loaded Gyro-TWT Amplifier," 2019 *International Vacuum Electronics Conference (IVEC)*, Busan, Korea (South), 2019, pp. 1-2.

**Akash** and M. Thottappan, "3D Beam-Wave Interaction Study in a Dielectric Loaded W- band Gyro-TWT using MAGIC," 2018 *IEEE MTT-S International Microwave and RF Conference (IMaRC)*, Kolkata, India.

**Akash** and M. Thottappan, "Design Studies of Two-Stage Depressed Collector for Millimeter Wave Gyro-TWT Using "MAGIC", *IEEE CONECCT 2020*, Bangalore, India.