References

Arfken, G., *Mathematical Methods for Physicists*, 3rd ed., Academic Press, Orlando, Florida (1985).

Basu, S. and L. M. Gutheinz, "Fractional power in the bucket, beam quality and M^2," *Proc. SPIE* **7579**, 75790U (2010) [doi: 10.1117/12.846382].

Born, M. and E. Wolf, *Principles of Optics*, 6th ed., Pergamon Press, Oxford (1980).

Carter, W. H., "Spot size and divergence for Hermite Gaussian beams of any order," *Appl. Opt.* **19**(7), 1027–1029 (1980).

Fox, A. G. and T. Li, "Resonant modes in a maser interferometer," *Bell Syst. Tech. J.* **40**, 453 (1961).

Gaskill, J. D., *Linear Systems, Fourier Transforms and Optics*, John Wiley & Sons, New York (1978).

Gerchberg, R. and W. Saxton, "A practical algorithm for the determination of the phase from image and diffraction plane pictures," *Optik* **35**(2), 237–246 (1972).

Goodman, J. W., *Introduction to Fourier Optics*, McGraw-Hill, New York (1968).

International Standards Organization (ISO), "Lasers and Laser-Related Equipment–Test methods for laser beam parameters: beam widths, divergence angle and beam propagation factor," ISO 11146:1999, International Standards Organization, Geneva (1999).

International Standards Organization (ISO), "Lasers and Laser-Related Equipment: Test methods for laser beam widths, divergence angles and beam propagation ratios," ISO 11146-3:2004, International Standards Organization, Geneva (2004).

International Standards Organization (ISO), "Lasers and Laser-Related Equipment: Test methods for laser beam widths, divergence angles and beam propagation ratios," ISO 11146-1:2005, International Standards Organization, Geneva (2005).

Janssen, A. J. E. M., S. van Haver, P. Dirksen, and J. J. M. Braat, "Zernike representation and Strehl ratio of optical systems with variable numerical aperture," *J. Mod. Opt.* **55**(7), 1127–1157 (2008).

Johnston, T. F. and M. W. Sasnett, "Characterization of Laser Beams: The M^2 Model," in *Handbook of Optical and Laser Scanning*, G. F. Marshall and G. E. Stutz, Eds., Marcel Dekker Inc., New York (2004).

Kant, I., *Critique of Pure Reason*, J. M. D. Meikljohn, Translator, in *Great Books of the Western World, Encyclopedia Brittanica* **52** (1952).

Kolmogorov, A., "A refinement of previous hypotheses concerning the local structure of turbulence in a viscous incompressible fluid at high Reynolds number," *J. Fluid Mech.* **13**, 82–85 (1962).

Maréchal, A., "Étude des effets combinés de la diffraction et des aberrations geometriques sur l'image d'un point lumineux," *Revue d'Optique Théorique et Instrumentale* **26**(9), 257–277 (1947).

Motes, R. A. and R. W. Berdine, *Introduction to High-Power Fiber Lasers*, Directed Energy Professional Society, Albuquerque, New Mexico (2009).

Phillips, R. L. and L. C. Andrews, "Spot size and divergence for Laguerre Gaussian beams of any order, *Appl. Opt.* **22**(5), 643–644 (1983).

Ross, T. S., "An analysis of a non-Gaussian, Gaussian laser beam," *Proc. SPIE* **6101**, 610111 (2006) [doi: 10.1117/12.640436].

Ross, T. S., "The effect of aperturing on laser beam quality," *Solid State and Diode Laser Technology Review*, Technical Summary (Section on Beam Combination and Control), Directed Energy Professional Society, Albuquerque, New Mexico (2007).

Ross, T. S., "Limitations and applicability of the Maréchal approximation," *Appl. Opt.* **48**(10), 1812–1818 (2009).

Ross, T. S. and W. P. Latham, "Appropriate measures and consistent standard for high-energy laser beam quality," *J. Dir. Energy* **2**, 22–58 (2006).

Saleh, B. and M. Teich, *Fundamentals of Photonics*, John Wiley & Sons, New York (1991).

Siegman, A. E., *Lasers*, University Science Books, Mill Valley, California (1986).

Siegman, A. E., "How to (Maybe) Measure Laser Beam Quality," from October 1997 OSA Conference on Diode Pumped Solid State Lasers: Applications and Issues (DLAI), Optical Society of America, Washington, D.C. (1998).

Index

T. Sean Ross received B.S. and M.S. degrees in Physics from Brigham Young University and a Ph.D. in Optical Sciences and Engineering from CREOL, The College of Optics and Photonics at the University of Central Florida. He has served in both the United States Air Force and Navy. Since 1998, he has worked for the Air Force Research Laboratory, Directed Energy Directorate in Albuquerque, New Mexico, where he has worked in the fields of nonlinear optics, laser development, and laser system integration. He was the chair of the Solid State Diode and Laser Technology Review from 2000 to 2011 and has taught laser beam quality short courses for the Directed Energy Professional Society and SPIE.