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Calculations of M-squared values for clipped focused Gaussian beams using vector diffraction theory GLEN GILLEN, KENDRA BAUGHMAN, Cal Poly State University, San Luis Obispo — Vector diffraction theory is applied to apertured Gaussian laser beam propagation. The computational model developed treats the light field as a 6-component vector electromagnetic wave. None of the commonly employed approximations are assumed (i.e., ray optics, scalar field approximations, paraxial approximations, wavelengths much smaller than longitudinal or tangential distances, etc.) A conductive circular aperture is placed in a converging Gaussian laser beam. Light field distributions beyond the aperture and within the focal region are investigated as a function of the clipping ratio (the ratio of the aperture radius to the Gaussian beam width in the diffraction plane.) The effects of a variety of clipping ratios on the field's maximum intensity and the beam's M-squared value are investigated.

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