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Producing Kaleidoscope Modes using the Digital Laser

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Abstract content :

With ruggedness inherent in its optical design, the Porro prism laser has been widely used for many years in field applications, for example in the lasers used in range finding and target designation systems. A “petal” mode is commonly produced by these systems, but until recently the formation of these modes was not understood. Our previous work uses symmetry arguments to explain how these modes are formed, and a physical optics model based on these principles produces the observed petal modes. By increasing the transverse area available to the beam this model predicts novel modes, dubbed “kaleidoscope modes”, and later shown to be Laguerre modes. However, relying as they do on perfect symmetry and alignment, these modes are difficult to produce. We demonstrate that with our new “digital laser” we are able to produce these modes on demand, opening up the field of study of high-order Laguerre modes.

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