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Hybrid Poincare beams from the source

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Current laser cavities are designed in such a way as to generate fundamental Gaussian modes, however, these modes are not suited for the application in hand which raise the need for higher-order modes. Examples of such modes are the higher-order vector vortex modes which are spatial modes of light with a non-uniform polarization distribution. These higher-order modes are routinely generated in the laboratory outside a laser cavity, using a variety of polarization optics, and through manipulation of the dynamic and geometric phase of light. Inside the laser cavity however, controlling higher-order modes has proven to be a non-trivial task especially in separating degenerate higher-order laser modes such as Laguerre Gaussian vortex modes, as they possess identical propagation characteristics, intensity distributions and size. The experimental realization of other higher-order beams directly from a laser cavity is also a non-trivial task with little evidence of control to-date. Furthermore, current detection schemes for laser modes are only effective for low order modes, however, the efficient sorting of very high order modes remains topical. We experimentally demonstrate an optical resonator that could generate intra-cavity first order Laguerre Gaussian mode. Lastly, we show how the system the system will be manipulated to generate modes with large orders (greater than 100).

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

Prof. Andrew Forbes
andrew.forbes@wits.ac.za
University of the Witwatersrand

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

Primary author: Ms SROOR, Hend (University of The Witwatersrand)

Co-authors: Prof. FORBES, Andrew (CSIR); Dr NAIDOO, Darryl (Council for Scientific and Industrial Research)

Presenter: Ms SROOR, Hend (University of The Witwatersrand)

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