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Controlling the spatial distribution of multiplexed modes

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The computer-controlled shaping of light beams using digital holography has triggered the applications of these to a great variety of fields. Technological advances had provided with devices capable not only to generate almost any beam shape but also to multiplex multiple beams simultaneously. This property has provided a new tool to explore novel fields. The idea behind multiplexing is to encode each beam with a unique carrier frequency that in the Fourier plane translates into beams positioned at different locations. Hence, by controlling the carrier frequency of each beam it is possible to selectively send beams to specific locations. In this work we first study, via a correlation function of the experimentally generated beam against its theoretical counterpart, the maximum number of beams that can be multiplexed. We then show how this principle can be applied to generate multiple beams arrayed in well-defined symmetrical positions. Ultimately, this technique will allow us to selectively excite certain regions with fabricated Nitrogen vacancy (NV) centers on a diamond sample towards the generation of novel SPDC crystals of great relevance in the generation of single photons for secure communication channels.

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

Yes

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

MSc

Main supervisor (name and email)
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Would you like to
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No

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