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Beam shaping applied to Spontaneous Parametric Down-Conversion (SPDC)

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The study of the spatial properties of light has been rapidly evolving in the past decades. One of many applications of studying spatial light can be found in the field of quantum optics and quantum information. In these fields of study, it has become increasingly important to shape beams in experiments. This is done in order to achieve a desired output, such as increasing the entanglement amongst photons for example. This can be achieved in theory by investigating the degree of entanglement of two correlated photons created by the process of spontaneous parametric down-conversion of an input photon whose transverse probability distribution is given by the field known as a pump field. Manipulation of the pump beam in order to attain a specified correlation between the two output beams is what is known as pump shaping. Here we aim for an arbitrary decomposition of the output beams in two bases (Hermite-Gaussian or Laguerre-Gaussian transverse modes), depending on the desired properties that wish to be explored. One noteworthy result is the generation of high dimensional maximally entangled states with no post-selection.

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

Yes

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

MSc

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