Generation Gauss-Bessel beams with vortex phase plates at formally inadequate wavelengths

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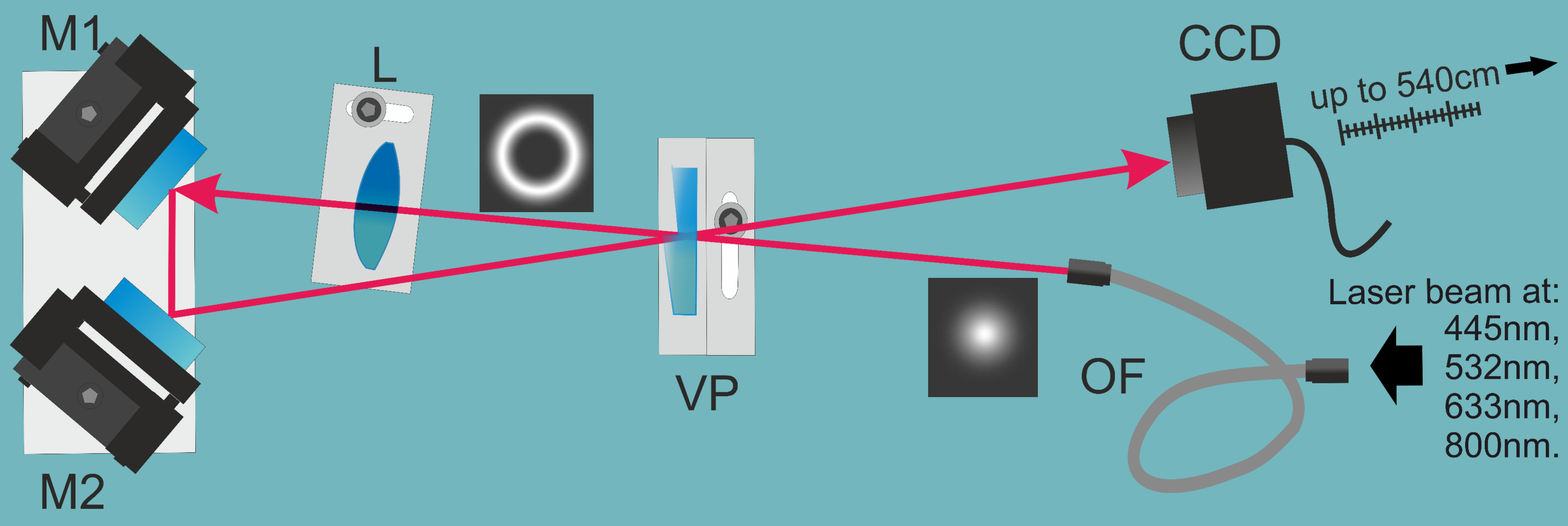
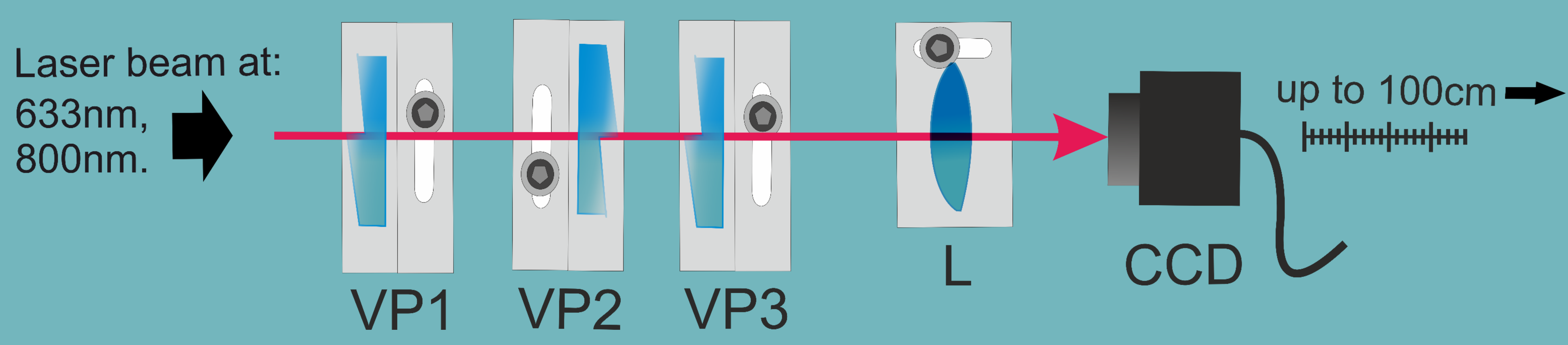
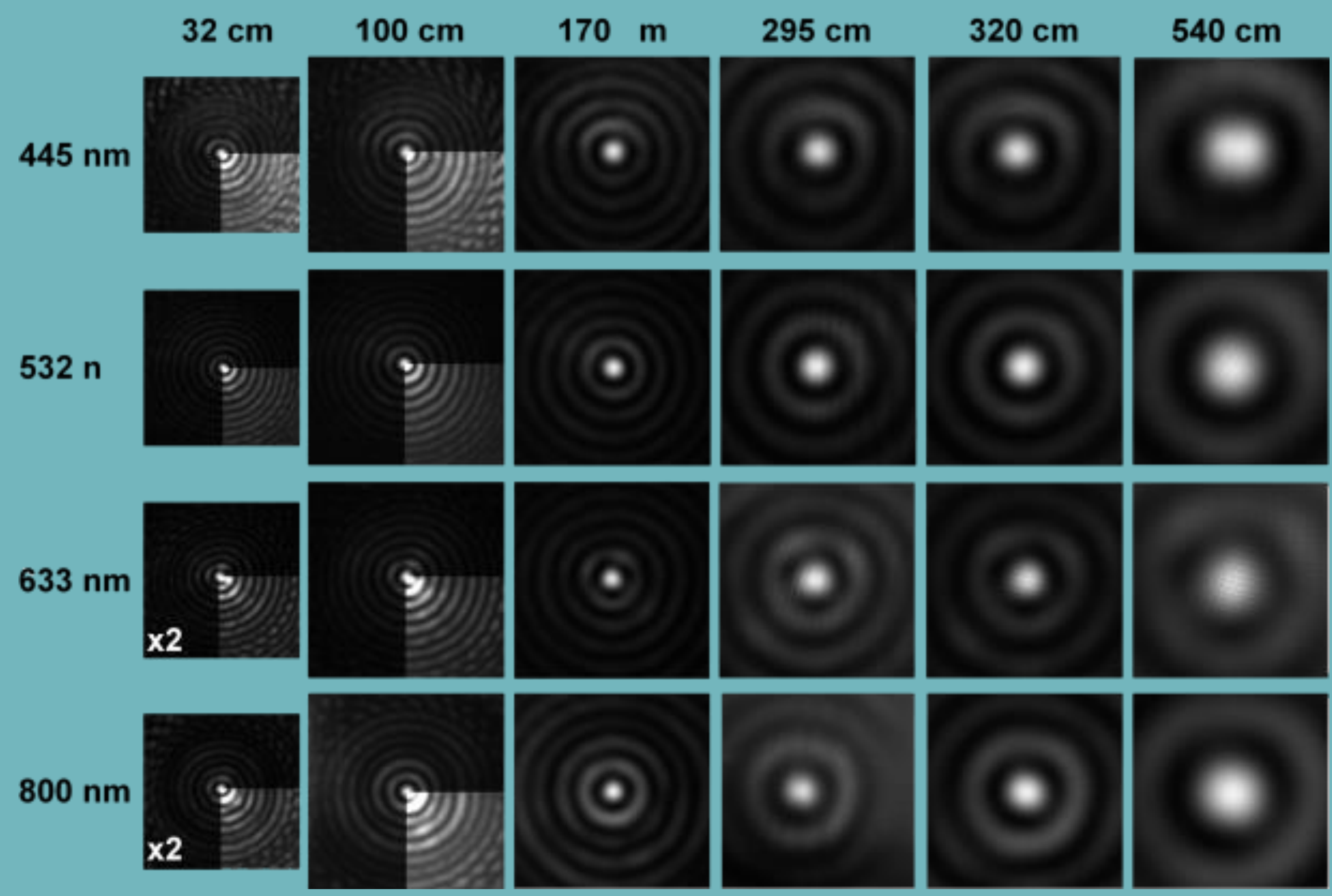
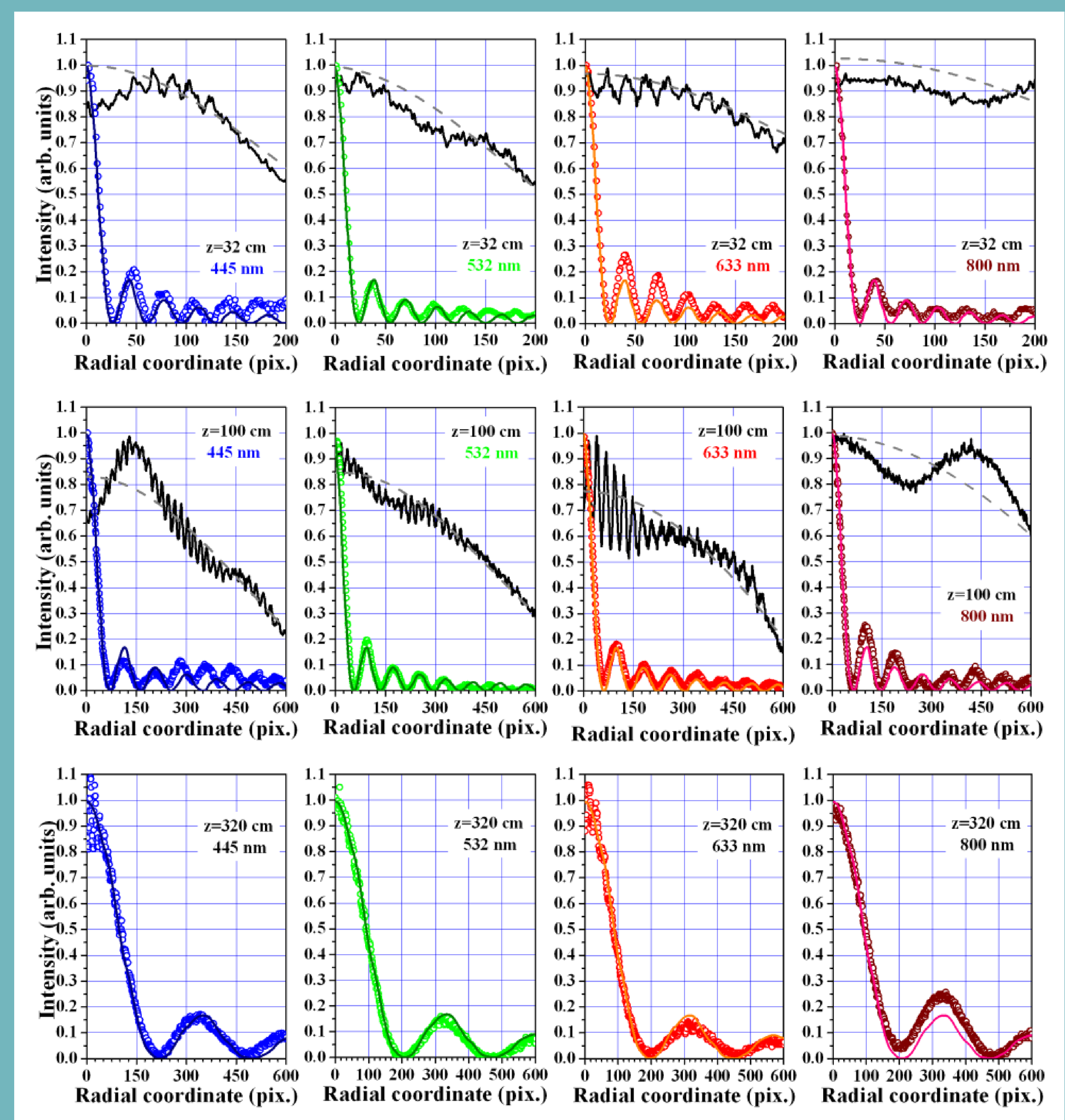
In the first studies of the generation of long-range quasi-non-diffracting Gauss-Bessel beams (GBBs) by creating and annihilating multi-charge optical vortices (OVs) [1-3], calibrated reflective liquid-crystal spatial light modulators are used. Because of their low damage threshold, they are not applicable with high-power laser beams. Vortex phase plates (VPs; phase plates which thickness is varying azimuthally) are an adequate solution of this problem. The limitation is, however, that each VP is designed to produce the desired integer topological charge (TC) at a specified wavelength. If the used wavelength is different, OVs with fractional TCs are created and the background beam becomes accordingly modulated.









References
[1] L. Stoyanov et al., Scientific Reports 10, 21981 (2020).
[2] L. Stoyanov et al., Optics Communications 480, 126510 (2021).
[3] L. Stoyanov et al. Optics Express 29, 10997-11008 (2021).

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