

# Stable Vortex-Bright Soliton Structures in Two-Component Bose Einstein Condensates

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We report the numerical realization and demonstration of robustness of certain 2-component structures in Bose-Einstein Condensates in 2 and 3 spatial dimensions with non-trivial topological charge in one of the components. In particular, we identify a stable symbiotic state in which a higher-dimensional bright soliton exists even in a homogeneous setting with defocusing interactions, as a result of the effective potential created by a stable vortex in the other component. The resulting vortex-bright solitary waves, which naturally generalize the recently experimentally observed dark-bright solitons, are examined both in the homogeneous medium and in the presence of parabolic and periodic external confinement and are found to be very robust.

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