Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Measurement of the topological charge of mixed OAM states[1]
MARIIA SHUTOVA, ALEXANDRA ZHDANOVA, ALEXEI SOKOLOV, Texas AM Univ — In the current work, we investigate how the technique of measuring the topological charge of an optical vortex by using a tilted convex lens (tilted lens technique) works for optical vortices in mixed orbital angular momentum (OAM) states (i.e. the case when one beam contains several components with different values of topological charge). A mixed OAM state may occur, for example, because of perturbations in the optical devices used to generate the state, such as spatial light modulators or spiral phase plates. Hence, we present experimental results and theoretical simulations for the measurement of the topological charge of mixed states with variable amounts of each component contributing to the total beam intensity. We also investigate two different cases: first, when interference between components is present (coherent addition of component OAM states), and second, when interference is absent (incoherent addition). We conclude that in both cases the results of the tilted lens technique are valid for that component of light which is dominant (i.e. the component that contributes to more than 50% of the beam's total intensity).

[1]Presenter is supported by the Herman F. Heep and Minnie Belle Heep Texas AM University Endowed Fund administered by the Texas AM Foundation

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Date submitted: 28 Jan 2016 Electronic form version 1.4