

Boudewijn Roukema, IA, NCU, Detecting cosmic voids via maps of geometric-optics parameters

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Can individual cosmic voids be detected in deep photometric surveys without spectroscopic data or photometric redshifts? The curved- spacetime geometric-optics maps of a deep survey should, in principle, contain information about voids present in the intrinsic three-dimensional dark matter distribution. A heuristic algorithm for detecting voids this way will be presented, with results indicating that blind searches should be able to make predictions of void locations and sizes that are falsifiable by spectroscopic followup. This should lead to characterising voids both by wall galaxies and by the straight paths of light through the voids that reveal the voids' spacetime curvature (which in the weak lensing formalism is approximated as the "bending" of light in a fictitious uncurved spacetime).

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