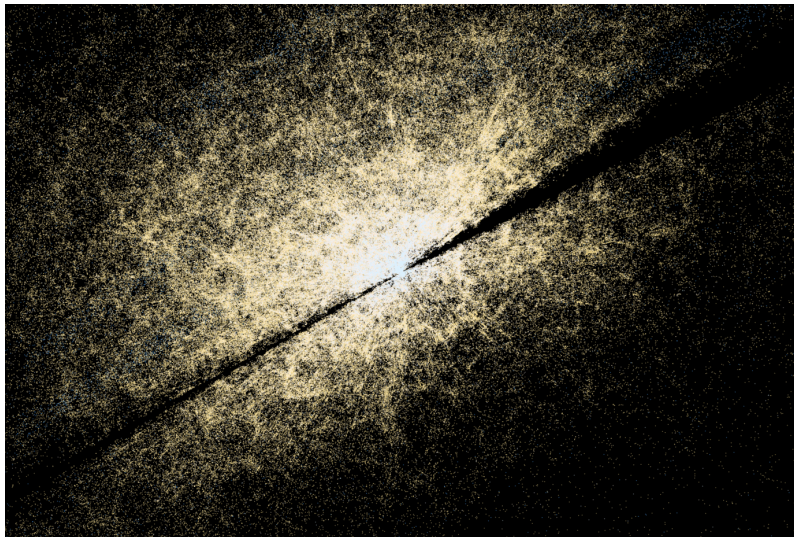


What can we learn from future surveys of Large Scale Structure in the Universe?

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In the past years we were able to determine the basic parameters of our Universe with good precision by observations of the cosmological microwave background, especially with the Planck satellite. We plan to repeat and improve this success story with the observation of cosmological large scale structure (LSS) via galaxy surveys, e.g. with the Euclid satellite under construction at ESA. In my talk I shall discuss several aspects of this much larger but also much more complicated dataset. I shall show that we do not only observe the density fluctuations but also the gravitational field and the velocity field by taking correctly into account that all observations are made on the (perturbed) background lightcone. This relativistically correct description of LSS observations is not only a curse but also a blessing as it allows e.g. to test General Relativity on cosmological scales. I shall also show that an incorrect analysis of deep surveys leads, e.g. to wrong values for the neutrino mass.

The attached image is from the Sloan Digital Sky Survey, please add 'credit: www.sdss.org'