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Baryonic impact on weak lensing peak statistics

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Next-generation weak gravitational lensing surveys, including Euclid, will be able to measure weak lensing signals with high statistical accuracy all the way into the regime probing the scales of non-linear collapse. To be able to exploit these measurements to the fullest extent and, in the end, most accurately determine the cosmology, we must have an accurate understanding of the baryonic physics that impacts these scales. Using the new hydrodynamical simulation suite FLAMINGO, which contains subgrid models for the most prominent astrophysical feedback processes (i.e. accretion by SMBHs and supernova feedback) that affect the large-scale structure of the Universe, and has been calibrated to match key observables (i.e. galaxy stellar mass function and cluster baryon fractions), I focus on the baryonic impact on weak lensing peak counts. Peak counts are the highest values of weak lensing convergence maps and thereby correspond to the most massive clusters along the line of sight. These statistics are therefore very sensitive to small-scale baryonic physics but also contain valuable information about the evolution of the structures within the Universe and have been shown to be complementary to traditional n-point statistics. Understanding their properties can ultimately help us constrain both cosmology as well as galaxy physics as they are highly sensitive to both. I focus on the impact the different baryonic models have and to what extent we expect this to impact the cosmology inference from Euclid's measurements at small scales.

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