Contribution ID: **3** Type: **not specified**

Emptiness vs. Incompleteness: Selection effects on Cosmic Void BAO

Thursday 9 September 2021 14:20 (20 minutes)

In the context of the study of large-scale structure of the Universe, we analyze the response of cosmic void clustering to selection effects, such as angular incompleteness due to observational systematics and radial selection functions. We find for the case of moderate (<20%) incompleteness: that void sample selection based on a constant radius cut yields robust measurements. This is particularly true for BAO-reconstructed galaxy samples, where large-scale void exclusion effects are mitigated. We also find for the case of severe (up to 90%) incompleteness, a stronger void exclusion effect that can affect the clustering on large scales even for post-reconstructed data, when using the constant cut. For these cases, we introduce void radius selection criteria depending on the (local) observed tracer density that maximizes the BAO peak signal to noise ratio. This selection prevents large exclusion features from contaminating the BAO signal. An accurate estimation of the void distribution is necessary to obtain unbiased clustering measurements with either criterion when dealing with severe incompleteness, such as can be found at the edges of the radial selection function. Moreover we finally verify, with large simulated data sets including lightcone evolution, that both void sample definitions (local and constant) yield unbiased BAO scale measurements. In conclusion, cosmic voids can be used as robust tracers for clustering measurements, even in the case of (moderately) unknown systematics.

Author: FORERO SANCHEZ, Daniel Felipe (EPFL - EPF Lausanne)

Co-authors: Dr ZHAO, Cheng (EPFL); Dr TAO, Charling (Aix Marseille Université); Dr CHUANG, Chia-Hsun (KIPAC); Dr KITAURA, Francisco-Shu (Instituto de Astrofísica de Canarias); Mr VARIU, Andrei (EPFL); TAMONE, Amélie (EPFL); KNEIB, Jean-Paul (EPFL)

Presenter: FORERO SANCHEZ, Daniel Felipe (EPFL - EPF Lausanne)

Session Classification: CoCo