APR18-2018-000460

Abstract for an Invited Paper
for the APR18 Meeting of
the American Physical Society

Mapping Dark Matter from the Hubble Frontier Fields Clusters

MATHILDE JAUZAC, Durham University

The outskirts of clusters make the best, and most efficient locations to observe and trace the mass assembly processes of the Cosmic Web. Residing at the vertices of this Cosmic Web (Bond et al. 1996), galaxy clusters grow by steady accretion of matter from the surroundings, as well as by discrete mergers with nearby groups and clusters. Supported by simulations, this scenario predictions regarding the total mass content and distribution in filaments themselves remain largely untested. Filaments are vital elements of the cosmic census, containing up to half the baryonic mass of the Universe as a 'warm hot intergalactic medium' but also the majority of the dark matter. Recently, some of the most massive and disturbed clusters have been the centre of attention thanks to the *Hubble Frontier Fields* (HFF) initiative, which constitutes the largest commitment ever of *Hubble Space Telescope* (HST) time to the exploration of the distant Universe via gravitational lensing by massive galaxy clusters. These clusters were chosen for their strong lens properties, and are all highly disturbed objects, showing major and minor merging on-going processes, making them ideal target to trace the Cosmic Web assembly. While combining strong and weak-lensing regimes to map the total mass with X-rays observations of the hot gas and spectroscopy of cluster galaxies to look at their direction of motion, we can thus study the dynamical scenarios in place within these massive galaxy clusters, and trace the sub-structures engaged in these processes. I will present the latest results we obtained on the HFF clusters, and discuss the different caveats present on both the observing and simulation sides. Finally, I will present the upcoming BUFFALO large HST programme, the 'spatial extension' of the HFF that will start in July 2018.