Ateliers action Dark Energy 2021

Rapport sur les contributions

https://indico.in2p3.fr/e/23980

ID de Contribution: **12** Type: **Non spécifié**

The cosmological imprint of massive neutrinos in dark matter simulations

vendredi 25 juin 2021 15:00 (30 minutes)

Orateur: BEL, Julien (CPT Marseille)

Classification de Session: Neutrinos et LSS

ID de Contribution: **13** Type: **Non spécifié**

discussion

vendredi 25 juin 2021 14:30 (30 minutes)

Classification de Session: Neutrinos et LSS

ID de Contribution: **14** Type: **Non spécifié**

Potential role of non-standard neutrino physics on structure formation

vendredi 25 juin 2021 14:00 (30 minutes)

Orateur: Prof. LESGOURGUES, Julien (Aachen)

Classification de Session: Neutrinos et LSS

ID de Contribution: **15** Type: **Non spécifié**

discussion

vendredi 25 juin 2021 15:30 (30 minutes)

Classification de Session: Neutrinos et LSS

ID de Contribution: **16** Type: **Non spécifié**

discussion

vendredi 25 juin 2021 17:20 (1 heure)

Classification de Session: Neutrinos et LSS

ID de Contribution: **17** Type: **Non spécifié**

Aspects non-linéaires dans le galaxy clustering pour les modèles de gravité modifiée

jeudi 24 juin 2021 14:00 (20 minutes)

Orateur: VERNIZZI, Filippo (IPhT - CEA Saclay)

Classification de Session: Modified gravity & simulations

ID de Contribution: **18** Type: **Non spécifié**

discussion

jeudi 24 juin 2021 14:40 (30 minutes)

Classification de Session: Modified gravity & simulations

ID de Contribution: **19** Type: **Non spécifié**

Effet des baryons & modification de la gravité

jeudi 24 juin 2021 15:10 (30 minutes)

Orateur: DUBOIS, Yohan (IAP Paris)

Classification de Session: Modified gravity & simulations

ID de Contribution: **20** Type: **Non spécifié**

discussion

jeudi 24 juin 2021 15:40 (30 minutes)

Classification de Session: Modified gravity & simulations

ID de Contribution: **21** Type: **Non spécifié**

discussion

jeudi 24 juin 2021 17:30 (1 heure)

Classification de Session: Modified gravity & simulations

ID de Contribution: **22** Type: **Non spécifié**

Modeles semi-analytiques pour le spectre de puissance non-lineaire

jeudi 24 juin 2021 14:20 (20 minutes)

Orateur: VALAGEAS, Patrick (CEA Saclay)

Classification de Session: Modified gravity & simulations

ID de Contribution: **23** Type: **Présentation**

Internal dark matter structure of the most massive galaxy clusters since redshift 1

jeudi 24 juin 2021 16:50 (20 minutes)

The evolution of the dark matter profiles of high-mass galaxy clusters from z~1 to the present day remains poorly constrained and is a powerful test of the LambdaCDM model. Such a test requires systematic confrontations of observations of a representative sample of the Universe's most massive clusters, preferably in several redshift bins, with tailor-made numerical simulations. To date, there exist no cosmological numerical simulations with the exceptionally large volume (required to simulate the rarest, most massive clusters) and the resolution (required to resolve their structure) necessary to undertake such a project. We will present the first results from a simulation campaign aimed at producing large cosmological simulations that are 1 Gpc/h on a side and have a medium mass and spatial resolution. They are being complemented with very-high resolution zoom simulations which are progressively including the non-gravitational physics of galaxy formation such as star formation, supernova and AGN feedback. The simulations are produced using the AMR code RAMSES. The first results are based on a subset of the systems, consisting of the 25 most massive galaxy clusters at each redshift (z=1, 0.8, 0.6 and 0) to study the evolution of their internal structure, finding that their dark matter profiles within r500 are strikingly similar from z ~ 1 to the present day, exhibiting a low dispersion of 0.15 dex, and showing little evolution with redshift in the radial logarithmic slope and scatter. They have the running power law shape typical of the NFW-type profiles, but their inner structure shows no signs of converging to an asymptotic slope. This suggests that this type of profile is already in place at z > 1 in the highest-mass haloes in the Universe, and that it remains exceptionally robust to merging activity.

Auteur principal: Dr LE BRUN, Amandine (PSL & Observatoire de Paris)

Co-auteurs: Dr ARNAUD, Monique (DAp, CEA Saclay); Dr PRATT, Gabriel (DAp, CEA Saclay); Prof. TEYSSIER, Romain (University of Zurich)

Orateur: Dr LE BRUN, Amandine (PSL & Observatoire de Paris)

Classification de Session: Modified gravity & simulations

ID de Contribution: **24** Type: **Non spécifié**

pause

Classification de Session: Modified gravity & simulations

ID de Contribution: **25** Type: **Présentation**

Constraining neutrino mass using three-point mean relative velocity statistics

vendredi 25 juin 2021 16:20 (30 minutes)

Velocity field provides a new avenue to constrain cosmological information, and one of the commonly used statistics is the mean radial pairwise velocity. In this talk, we consider the three-point mean relative velocity (i.e. the mean relative velocities between pairs in a triplet), and show that it is a novel probe of neutrino mass estimation. We explore the full cosmological information content of the halo mean pairwise velocities, and the mean relative velocities between halo pairs in a triplet using 22,000 simulations from the Quijote suite. We find that the mean relative velocities in a triplet allows a 1-sigma neutrino mass constraint of 0.065 eV, an order of magnitude better than the mean pairwise velocity constraint. We also introduce a new estimator based on three-point mean relative velocities, and showcase how it can constrain neutrino mass independent of sigma8 and optical depth alleviating the degeneracy with these parameters. These results illustrate the possibility of exploiting the mean three-point relative velocities for constraining the cosmological parameters accurately from future cosmic microwave background experiments and peculiar velocity surveys.

Auteur principal: KURUVILLA, Joseph (IAS, Universite Paris-Saclay)

Orateur: KURUVILLA, Joseph (IAS, Universite Paris-Saclay)

Classification de Session: Neutrinos et LSS

ID de Contribution: **26** Type: **Présentation**

Constraining the total neutrino mass with the power spectrum

vendredi 25 juin 2021 16:50 (30 minutes)

While neutrino oscillation experiments achieved high precision measurement on the neutrino squared mass differences, the absolute scale and hierarchy are still unknown. On the cosmology side, massive neutrino's transition from a relativistic to a non-relativistic specie leaves an imprint on the Cosmic Microwave Background (CMB) temperature power spectrum, allowing for tighter constraint on the sum of the masses. Moreover, because of their high thermal velocity dispersion, even at late times, cosmological neutrinos free stream through gravitational potential wells, provoking a damping of the CDM clustering on scales smaller than their free streaming scale. This damping will be imprinted in the galaxy power spectrum, making it a probe of choice to estimate the total neutrino mass. In this talk I will present my results on the estimation of neutrino masses with the real space power spectrum of the DEMNUni (Dark Energy and and Massive Neutrino Universe) simulations. I tested different models of the non-linear power spectrum as well as several methods to estimate the covariance matrix of this observable, to achieve accurate and precise constraints on the total neutrino mass together with other cosmological parameters.

Auteur principal: GOUYOU BEAUCHAMPS, Sylvain (CPPM)

Orateur: GOUYOU BEAUCHAMPS, Sylvain (CPPM)

Classification de Session: Neutrinos et LSS

ID de Contribution: **27** Type: **Présentation**

Imprints of Modified Gravity Scenarios on the Inner Structure of Massive Dark Matter Halos

jeudi 24 juin 2021 16:30 (20 minutes)

Auteur principal: Dr CORASANITI, Pier-Stefano (CNRS & Observatoire de Paris)

Orateur: Dr CORASANITI, Pier-Stefano (CNRS & Observatoire de Paris)

Classification de Session: Modified gravity & simulations

ID de Contribution: **28** Type: **Non spécifié**

Can modified gravity (partly) emulate dark matter?

Orateur: FAMAEY, Benoit (CNRS Observatoire astronomique de Strasbourg)

ID de Contribution: **29** Type: **Non spécifié**

Can modified gravity (partly) emulate dark matter?

jeudi 24 juin 2021 17:10 (20 minutes)

Orateur: FAMAEY, Benoit (CNRS Observatoire astronomique de Strasbourg)

Classification de Session: Modified gravity & simulations