a difficult matter, as is indicated by the existence of numerous clusters catalogs. However, the knowledge of their completeness, purity, and how those parameters change with redshift and mass of the clusters found is of paramount importance when trying to assess the impact of a particular sample on the determination of cosmological parameters. For that reason, the DES Cluster Working Group has set a project with the objective of comparing cluster finding algorithms. Amongst them the maxBCG, Voronoi Tesselation and Percolation, and the Matched-Filter (MF). We use the latter to perform cluster detection on a mock catalog of a 225sq.deg field based on the Hubble Volume Simulation. Those catalogs were produced for the DES collaboration to act as a fiducial system for the cluster finding algorithms. The code produces likelihood maps for several redshift slices and assumes that clusters are spherical over-densities, characterized by a specific radial profile and luminosity function. Source extraction is performed on those maps for a given threshold and clusters found in more than two redshift slices are taken as persistent and their properties, such as redshift and richness, are recorded. Finally, we compare the richness and redshift distribution of the found clusters with the halos. While their distributions are quite similar, only 40% of the halo sample is matched on a rather stringent match process that is based on coordinates, redshift and richness. However, this may be related to the lack of faint galaxies in the mock catalog.

PAINEL 26

THE IMPACT OF RADIO FEEDBACK FROM AGN IN COSMOLOGICAL SIMULATIONS: EVOLUTION OF DISC GALAXIES

Takashi Okamoto[1], <u>Rodrigo Nemmen</u>[2], Richard Bower[1]
1 - ICC - Durham University
2 - IF/UFRGS

In this work, we present a new implementation of feedback due to active galactic nuclei (AGN) in cosmological simulations of galaxy formation. We assume that a fraction of jet energy, which is generated by an AGN, is transferred to the surrounding gas as thermal energy. Combining a theoretical model of mass accretion on to black holes with a multiphase description of star-forming gas, we self-consistently follow evolution of both galaxies and their central black holes. The novelty in our model is that we consider two distinct accretion modes: standard radiatively efficient thin accretion discs and radiatively inefficient accretion flows which we will generically refer to as RIAFs; motivated by theoretical models for jet production in accretion discs, we assume that only the RIAF is responsible for the AGN feedback. The focus of this paper is to investigate the interplay between galaxies and their central black holes during the formation of a disc galaxy. We find that, after an initial episode of bursting star formation, the accretion rate on to the central black hole drops so that the accretion disc switches to a RIAF structure. At this point, the feedback from the AGN becomes efficient and slightly suppresses star formation in the galactic disc and almost completely halts star formation in the bulge. This suppression of the star formation regulates mass accretion on to the black hole and associated AGN feedback. As a result, the nucleus becomes a stochastically fuelled low-luminosity AGN (Seyfert galaxy) with recurrent short-lived episodes of activity after the star bursts. During the 'on' events, the AGN produces reasonably powerful jets (radio-loud state) and is less luminous than the host galaxy, while in the 'off' phase, the nucleus is inactive and 'radio quiet'. Our model predicts several properties of the low-luminosity AGN including the bolometric luminosity, jet powers, the effect on kpc scale of the radio jet and the AGN lifetime, which are in broad agreement with observations of Seyfert galaxies and their radio activity. We also find that the ratios between the central black hole mass and the mass of the host spheroid at z=0 are 0.001 regardless of the strength of either supernova feedback or AGN feedback because the radiation drag model directly relates the star formation activity in the Galactic Centre and the mass accretion rate on to the central black hole.

PAINEL 27

CONSTRAINING F(R) COSMOLOGIES FROM THE HUBBLE FUNCTION DETERMINATIONS

<u>Janilo Santos</u>[1], Fabio C. Carvalho[2,3], Edivaldo Moura Santos[4], Jailson S. Alcaniz[3,5]
1 - UFRN
2 - Divisão de Astrofísica - INPE/MCT
3 - Observatorio Nacional
4 - Centro Brasileiro de Pesquisas Físicas
5 - INPE

The observed late-time acceleration of the Universe poses one of the greatest challenges theoretical physics has ever faced. In principle, this phenomenon may be the result of unknown physical processes involving either modifications of gravitation theory or the existence of new fields in high energy physics. Although the latter route is most commonly used, following the former, an attractive and complementary approach to this problem, known as $f(R)$ gravity, examines the possibility of modifying Einstein's general relativity by adding terms proportional to powers of the Ricci scalar R to the Einstein-Hilbert action. At present, $f(R)$ gravity has been applied to Cosmology as a realistic alternative to dark energy. In this concern, a number of authors have investigated observational constraints on several $f(R)$ gravity models. As yet, these theories have been constrained using mainly data of type Ia supenovae, cosmic microwave background radiation (CMBR) and large scale structure (LSS). In this work, following the Palatini

variational approach to obtain the equations of motion, we use determinations of the Hubble function $H(z)$, which are based on differential age method, to place bounds on the free parameters of $f(R)=R-\beta/R^n$ models. We also combine the $H(z)$ data with constraints from baryon acoustic oscilations (BAO) and CMBR measurements obtaining ranges of values for n and β in agreement with other independent analyses. We find that, for some intervals of n and β, this type of gravity can produce the sequence of radiation-dominated, matter-dominated and accelerating periods without need of dark energy.

PAINEL 28

ESTUDO DE ANOMALIAS NA DISTRIBUIÇÃO ANGULAR DA RADIAÇÃO CÓSMICA DE FUNDO COM DADOS DO WMAP5

Larissa C. O. Santos, **Thyrso Villela, Armando Bernui**
INPE

Uma característica intrigante da distribuição angular da Radiação Cósmica de Fundo em Microondas (RCFM) foi observada através da análise dos dados obtidos pelo satélite COBE (*COsmic Background Explorer*). Foi constatado que o sinal do quadrupolo medido é mais baixo que o esperado pelo Modelo Cosmológico Padrão. Acreditava-se que esse baixo sinal poderia ser uma anomalia na distribuição angular da RCFM. Porém, estudos mais detalhados mostraram que esse valor está dentro dos limites aceitos pelo modelo considerando a barra de erro da medida e a variância cósmica. Portanto, a hipótese do baixo sinal do quadrupolo ser uma anomalia foi descartada. Com as medidas do primeiro ano e dos três anos de observações do satélite WMAP (*Wilkinson Microwave Anisotropy Probe*), anomalias efetivas foram detectadas na distribuição angular da RCFM, tais como o alinhamento entre o octopolo e o quadrupolo e a planaridade do octopolo e do quadrupolo. A probabilidade de que a distribuição angular das flutuações de temperatura da RCFM apresente essas características simultaneamente é muito baixa, o que exige uma maior investigação. Neste trabalho, investigamos o baixo valor do quadrupolo e as anomalias na RCFM para baixos multipolos através da análise dos dados de cinco anos do WMAP. Para essa análise está sendo utilizada a função de correlação de dois pontos e o método PASH (*Pair Angular Separation Histogram*), que utiliza histogramas de separação angular entre pares de flutuações de temperatura da RCFM no céu. A análise da função de correlação de dois pontos aplicada aos dados confirma um baixo valor para o quadrupolo. Os resultados preliminares obtidos com a utilização do método PASH mostram um desvio no caráter isotrópico da distribuição angular das flutuações de temperatura da RCFM na esfera celeste. Com base nesses resultados e em comparações dos dados com simulações Monte Carlo para o modelo ΛCDM, apresentamos as anomalias encontradas.

PAINEL 29

DISTÂNCIA DIÂMETRO ANGULAR EM COSMOLOGIAS LEMAÎTRE-TOLMAN

Nilo Sylvio Costa Serpa
OV/UFRJ

O presente estudo estabelece uma expressão da distância diâmetro angular, considerando um universo inomogêneo de Lemaître-Tolman (LT), no intuito de investigar se para tal universo haveria diferenças significativas no cálculo daquela distância em comparação com o mesmo cálculo na cosmologia Friedmann-Lemaître-Robertson-Walker (FLRW). Com base na curva teórica clássica da distância diâmetro angular em termos do desvio para o vermelho, do parâmetro de desaceleração e da constante de Hubble, e na condição de junção de Darmois, a nova expressão foi deduzida a partir de uma proporção entre as métricas LT e FLRW mediante um fator oriundo da condição de junção. Considerou-se uma situação na qual anisotropias referentes ao efeito Sunyaev-Zel'dovich (SZ) estão presentes na cosmologia LT. Os resultados das duas expressões mostram que as respectivas curvas teóricas se separam suave e significativamente em torno de z=0,06. O trabalho demonstra que é possível estabelecer uma expressão da distância diâmetro angular para cosmologias LT e que há, em princípio, uma diferença considerável entre as curvas teóricas dessa distância nos modelos LT e FLRW, fato que reflete diretamente a nítida distinção entre as imagens homogênea e inomogênea do universo. A expressão clássica definida em um universo homogêneo FLRW pode ser vista como um caso particular da expressão mais geral na cosmologia LT.

PAINEL 30

GROWTH OF PRIMORDIAL FLUCTUATIONS IN A VACUUM ENERGY DECAY MODEL

Hidalyn Theodory Clemente Mattos de Souza, **Nilza Pires**
UFRN

The formation of large-scale structures like galaxies and its definite comprehension remains one of the most challenging problems in the current cosmology. The standard theory for the origin of these structures is that they grew by gravitational instability from small, perhaps quantum generated, fluctuations in the density of dark matter, baryons and photons over an uniform primordial Universe. After the recombination, the baryons began to fall into the pre-existing gravitational potential wells of the dark matter, creating the first gravitationally bound clouds in our Universe. In this work we analyze the evolution of baryonic and dark matter fluctuations, in clouds of dark matter with masses within the range $10^4 M_\odot \leq M_d \leq 10^8 M_\odot$. In particular, we take into account