mais estudado, a ser essa componente, é a constante cosmológica que apresenta um parâmetro de densidade constante ao longo do tempo. Neste trabalho analisamos o comportamento do universo submetendo-o a alguns candidatos à energia escura introduzindo, para isso, uma equação de estado paramétrica - onde o parâmetro escolhido ($?_x$) representa várias possibilidades para a energia escura, entre elas a constante cosmológica (caso $?_x$=-1). Obtemos então expressões analíticas para os principais parâmetros do universo, tais como o parâmetro de Hubble e o parâmetro de desaceleração. Dessa forma, para cada candidato à energia escura é possível obter o redshift em que o universo começa a acelerar. Além da constante cosmológica, outros dois candidatos são utilizados para comparação - Gás de Chaplygin e Grávitons Massivos. O interesse pelo gás de Chaplygin vem da sua conexão com a Teoria de Cordas, e pelo fato da sua equação de estado poder ser obtida a partir da Ação de Nambu-Goto para d-branas movendo-se num espaço-tempo a (d+2)dimensões. Com relação aos Grávitons Massivos, o atual limite para a massa dessas partículas, obtido pela dinâmica do Sistema Solar, mostra que $m<10^{-54}$g. Apesar desse limite superior ser pequeno, quando se passa da Relatividade Geral para Teorias Bimétricas da Gravitação (onde a massa do gráviton é então relacionada com uma métrica de fundo não dinâmica), obtém-se um efeito de aceleração, da expansão do universo, semelhante ao fornecido pela constante cosmológica. Esses aspectos serão também discutidos no presente trabalho.

PAINEL 5

GRADIENT PATTERN ANALYSIS IN STRUCTURE FORMATION

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In this work, we present the preliminaries results of a study of the pattern evolution in the process of structure formation. We are applying, on N-body cosmological simulations data, the technique proposed by Rosa et al. (1998), for estimating asymmetries in the gradient field. The gradient pattern analysis consist in the application of asymmetrical fragmentation operators estimated over the gradient field of an image matrix, estimated for a complexity measure for non-linear extended systems. In this study, we have been working with the high resolution cosmological data simulated by the Virgo consortium for a 140(Mpc/h)^3 of a L-CDM Universe, by performing the statistical analysis of means, variance and correlation for the norm and phases of the asymmetrical vectors in the gradient field, for various redshift scales, in order to determine different dynamical regimes through analysis of the complex patterns arising from the evolutionary process of structure formation.

PAINEL 6

LARGE-SCALE ANISOTROPIC SIGNATURES IN THE WMAP DATA

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Modern cosmology is based on the Copernican principle which postulates that the Universe is homogeneous and isotropic on large angular scales. Isotropy of the CMB temperature fluctuations can be better understood in terms of statistical isotropy, which means that, on average, and for all angular scales, hot and cold temperature spots should be randomly distributed all over the celestial sphere. In particular, alignment of spots of same angular size is not expected. A lot of effort is currently being devoted to probe the statistical isotropy of the CMB temperature fluctuations data measured by the WMAP satellite, using various statistical tools. Intriguingly, the low-order multipoles, corresponding to large angular scales, show an unexpected alignment that appears independently of the technique used to remove the foregrounds from the WMAP data. Here we investigate the anisotropic signatures in CMB data measured by WMAP using a geometric-statistical method. To understand the role of each low-order multipole component in the CMB temperature fluctuations, we study the large angular scale correlations of these data in several cap-like regions of the celestial sphere. We analyze maps containing just one of the first low-order multipoles (starting with the quadrupole) and compare them with the scrutiny made on the map containing all the multipole components (with the monopole and dipole removed). Our results indicate that a very peculiar relationship regarding both spatial alignment and intensity of the first low-order multipoles, especially between the quadrupole and the octupole, is predominant in the WMAP data.

PAINEL 7

MATTER CREATION IN A FLAT FRW COSMOLOGY WITH NONLINEAR ELECTRODYNAMICS

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In the last few years, many authors have proposed cosmological models with matter creation in the context of General Relativity where the particle production is due to mechanisms such as the imperfect fluid with bulk viscosity or the decaying vacuum. On the other hand, many works investigate a possibility of