PAINEL 15

COSMOLOGIA COM LENTES GRAVITACIONAIS FRACAS: O EFEITO DA DEPENDÊNCIA DA PSF COM A COR

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A técnica de lentes gravitacionais fracas em cosmologia requer medidas da forma de galáxias fracas deconvoluídas da PSF (*point spread function* - função de espalhamento de um ponto) observacional com grande precisão. Por essa razão a PSF deve ser determinada, para cada galáxia, com grande acuidade. Infelizmente, por razões diversas (difração, óptica do instrumento, espalhamento dos elétrons no CCD etc.) a PSF usualmente depende do comprimento de onda, de modo que diferenças na SED (*spectral energy distribution* - distribuição espectral de energia) dos objetos observados introduz mais fator de complexidade. Neste trabalho investigamos o efeito da dependência da PSF com o comprimento de onda no caso onde a PSF é dominada pelo limite de difração do telescópio e filtros com grande largura de banda (largura a meia altura maior do que 1000Å) são usados para o processo de medida de forma. Calculamos os viéses introduzidos na estimativa de parâmetros cosmológicos associados à energia escura quando a PSF estelar é usada sem correções. Usando SEDs realísticas para estrelas e galáxias e uma PSF circular simples com três componentes (difração, difusão no CCD e uma componente acromática), encontramos que o efeito da dependência da PSF com a cor precisa ser levado em conta para a próxima geração de "surveys". Usamos dois métodos para corrigir esse efeito. Um que tem como parâmetro de entrada uma cor de cada objeto e outro em que é usada toda a informação fotométrica disponível e assume um modelo para a cromaticidade da instrumentação. Encontramos que ambos métodos corrigem o efeito em questão, dentro da precisão requerida para medidas da ordem de poucos porcento de erro nos parâmetros da equação de estado da energia escura. A comparação entre ambos métodos favorece o que usa a totalidade da informação fotométrica disponível pois sua eficiência é menos dependente do "redshift" das galáxias.

PAINEL 16

TIME AND DISTANCE CONSTRAINTS ON NONSTANDARD COSMOLOGIES

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The absence of a natural guidance from fundamental physics on the mechanism behind cosmic acceleration has given rise to a number of alternative cosmological scenarios. These are based either on modifications of gravitation theory at large scales or on the existence of new fields in Nature. In this work, we investigate the observational viability of some non-standard cosmological models in light of current lookback time-redshift data from passively evolving galaxies and recent estimates involving the product of the Cosmic Microwave Background acoustic scale and the baryonic acoustic oscillation peak. By using information-criteria model selection outlined in previous analyses, we select the best-fit models and rank the alternative scenarios. We show that some of these models may provide a better fit to the data than does the current standard cosmological scenario.

PAINEL 17

CMB ANGULAR POWER SPECTRUM IN ACCELERATING COSMOLOGY WITHOUT DARK ENERGY

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Many complementary cosmological data have established that the Universe is a flat and accelerated universe, constituted by neutrinos, radiation, baryons, cold dark matter (CDM) and an exotic fluid component named dark energy, which is driving the accelerating expansion. The main dark energy model is named concordance cosmic model or ΛCDM model and associates the dark energy to vacuum energy. This model is consistent with all extant data, but is plagued with several problems that have

inspired many authors to propose alternative candidates or models. Among these alternative models, that in which cosmic acceleration is powered uniquely by CDM particle creation is a good alternative to dark energy models. This model is compatible with SN Ia data, decelerated-accelerated transition, total and high redshift age Universe, but is necessary to verify its compatibility with the others cosmological observations. On the other hand, the cosmic microwave background radiation (CMB) is a very important information source about early universe and the CMB angular power spectrum is a restrictive cosmological test to cosmological models. In this work, we shown that CMB angular power spectrum is compatible with CDM particle creation models. For this, we determinate the semi-analytical form of CMB angular power spectrum and we study its dependency with main model parameters. We find that CMB angular power at CDM particle creation models is compatible with WMAP data for $0.4 \leq \alpha \leq 0.8$ and $0.0 \leq \beta \leq 0.1$ (with 2σ of confidence level), where α and β are matter creation rates in this cosmological models.

PAINEL 18

O MODELO NAVARRO-FRENK-WHITE PSEUDO-ELÍPTICO REVISITADO

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Devido a sua simplicidade computacional, modelos com potencial elíptico têm sido amplamente utilizados em aplicações de lenteamento gravitacional. Neste trabalho investigamos limites físicos do modelo Navarro-Frenk-White Pseudo-Elíptico (PNFW), utilizando o formalismo do "ângulo de deflexão" (Golse & Kneib 2002). Nós determinamos a forma dos iso-contornos da convergência em regiões próximas da curva crítica tangencial, onde se espera a formação dos arcos gravitacionais. Introduzimos uma figura de mérito para quantificar o desvio dessas curvas em relação a uma elipse e obtemos um critério quantitativo para evitar a chamada "forma de amendoim" que surge na distribuição de matéria, nesse tipo de modelo, para elipticidades elevadas. Esta análise nos permite determinar as regiões no espaço de parâmetros onde a distribuição de massa é aproximadamente elíptica, podendo representar de forma mais realista aglomerados de galáxias relaxados. Nós obtemos uma relação entre a elipticidade do potencial e a elipticidade associada à distribuição de matéria (ou seja, a que corresponde à elipse que melhor ajusta os iso-contornos de convergência). Além disso, estabelecemos relações de mapeamento entre as convergências características e elipticidades dos modelos PNFW e Navarro-Frenk-White com distribuição de massa elíptica (ENFW). São apresentadas funções analíticas que proporcionam excelentes ajustes para todas as relações mencionadas acima. Com estas relações estamos fazendo uma comparação entre as seções de choque para a formação de arcos obtidas com os modelos ENFW e PNFW visando determinar até que ponto o PNFW poderia ser uma alternativa ao uso do modelo ENFW em simulações que envolvam arcos gravitacionais, o que poderia agilizar significativamente essas simulações.

PAINEL 19

REALISTIC LENS MODELS FOR GRAVITATIONAL ARC SIMULATIONS IN THE DARK ENERGY SURVEY

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Massive galaxy clusters provide one of the most spectacular examples of strong gravitational lensing: images of background galaxies highly distorted by the cluster gravitational potential forming gravitational arcs. These strongly lensed systems have many cosmological applications. For example, the gravitational arcs offer an independent probe of the gravitational potential on scales r>50-100kpc, where the relative importance of barions becomes smaller. Statistically, the expected number of arcs can be combined with other observables to constrain the cosmology itself. Future wide-field photometric surveys like the Dark Energy Survey (DES) will detect thousands of gravitational arcs. A fundamental ingredient of the DES project is the production of simulated sky images, as realistic as possible, in order to test the analysis tools that will be applied on the real DES data. We present an approach to make realistic lens models by two methods i) using the projected mass distribution of dark matter halos obtained from n-body simulations and ii) making composite analytic models from

subhalo catalogs identified on these halos. As a preliminar result we show how the substructures and asymmetries in the realistic lens models can increase the lensing cross section when compared with a single analytic lens of equivalent mass, concentration and ellipticity. Therefore, we conclude that these more realistic models can substantially increase the expected number of arcs. The impact on arc abundance will be investigated through the implementation of these models on AddArcs, the arc simulation pipeline for DES mock images being developed by our group.

PAINEL 20

CONSTRAINING DARK MATTER-DARK ENERGY INTERACTION IN GENERAL CLASS OF VACUUM DECAY MODELS

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Observational evidence for the late-time cosmic acceleration have stimulated renewed interest in alternative cosmologies, such as scenarios with interaction in the dark sector (dark matter and dark energy). In general, such models contain an unknown negative-pressure dark component coupled with the dark matter field that results in an evolution for the Universe rather different from the one predicted by the standard ΛCDM framework. In this work we test the observational viability of a general class of vacuum decay models in which the interacting parameter [epsilon](a) is a function time. In order to place bounds on the evolution of [epsilon](a) we use different observational methods, like distance measurements of distant SN Ia, the ratio BAO/CMB at z=0.2 and z=0.35 and measurements of the gas mass fraction of galaxy clusters (f_{gas}). In particular, for this latter observable we use the most recent f_{gas} versus redshift data (57 X-ray luminous, dynamically relaxed galaxy clusters spanning the redshift range $0.057<z<1.261$). The results shows that, although the standard ΛCDM model is a good fit to this combination of data sets, an interacting dark energy component cannot be ruled out by current observations.

PAINEL 21

SEMI-EMPIRICAL RELATIVISTIC MODEL OF GALAXY MERGERS

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This work advances a semi-empirical relativistic model of galaxy number counts which considers that galaxy mergers may significantly alter counting evolution at recent cosmic time epochs (z < 5). Starting from a simple one-parameter redshift-dependent ansatz describing how galaxy masses may evolve with redshift if mergers increase the average galactic masses as z decreases, we apply this relationship to the currently most accepted standard relativistic cosmological model in order to predict how the theoretical number counts are changed in various possible scenarios, from weak to strong merging. We then use observational number counts extracted from the galaxy luminosity function data of the CNOC2, blue and red FORS galaxy samples (Lin et al. 1999; Gabash et al. 2004, 2006) provided by Albani et al. (2007) and Iribarrem et al. (2010ab), in order to compare the theoretical predictions of differential number counts evolution, which takes into account galaxy mergers, and their observational counterparts. The *E factor* advanced by Iribarrem et al. (2010a), which measures the discrepancy between the theoretical predictions and the observational results, is used in this comparison. Conclusions about the consistency of the underlying cosmological model, the strength of the merging effects and how they affect the overall number counting are presented.

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