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MEASURING GALAXY MORPHOLOGIES IN THE CFHT STRIPE 82 SURVEY

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We present the determination of galaxy structural parameters in the CFHT Stripe 82 Survey (CS82) stacked images. The CS82 survey covered an area of ~ 170 square degrees with the CFHT $3.6m$ telescope in a field determined by $-40 < RA < 45$ and $-1 < DEC < 1$ (within the SDSS stripe-82 region) in i-band to a depth of $mag_{AB} \sim 24$. Its excellent image quality (mean seeing of ~ 0.6) and uniformity makes CS82 specially suitable for applications involving gravitational lensing and galaxy morphology. The determination of galaxy structural parameters has applications to galaxy evolution studies, weak lensing, and the improvement of the photometry in other surveys (e.g. SDSS), through the "forced photometry" method. The morphological analysis of galaxies is performed through a profile-fitting method implemented with a combination of SExtractor v2.14.7 (which has model-fitting features) and PSFEx. First, we use SExtractor to perform the detection and obtain basic measurements of objects, then we use PSFEx to model the PSF across the field, and finally, we run SExtractor again to perform the model-fitting of objects. In particular we use 4 models implemented in SExtractor: Sérsic, de Vaucouleurs, exponential and 2-component de Vaucouleurs+exponential. In this work we outline the procedure described above and focus on a quality assessment of the determination of the ellipticities, through a comparison with the CS82 weak lensing catalogue obtained with the state-of-the-art code lensfit (Miller et al. 2007).

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IDENTIFICATION AND EXTRACTION OF PHOTOMETRIC REDSHIFTS OF QUASARS WITH NARROW-BAND FILTERS

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Although quasars are valuable targets for many cosmological applications, imaging surveys employing optical broad-band filter systems are unable to obtain accurate photometric redshifts for these objects. Broad-band imaging surveys also have some difficulty in distinguishing quasars from stars and HII regions of galaxies. However, the construction of a high-purity catalog of quasars, with accurate photometric redshifts, can be much more efficient with medium or narrow-band surveys, such as the upcoming J-PAS. In this work we discuss how to overcome the degeneracies in the color-color and color-magnitude diagrams that hamper the efficient detection of quasars, and how to obtain very good (near spectroscopic) photometric redshifts for these objects. In particular, we discuss how to include quasars in some of the most popular redshift codes, and the parallel need for the inclusion of spectral libraries for stars. We also discuss the importance of a good modeling of the distribution of point-sources in the sky, and the need for reliable luminosity functions that can inform the Bayesian estimation of types and photometric redshifts.

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GRAVITATIONAL WAVES FORMULATION FOR THE BRANE UNIVERSE AND POSSIBLE INDUCED CORRECTIONS ON AN OBSERVATIONAL LEVEL

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The observation of gravitational waves and their effect on different physical systems constitute one of most searched for proofs of the theory of general relativity. In this work, a brief summation on their construction based on general relativity and its observational consequences is presented with the intention of later extending the analysis to obtain the wave equation from the field equations that describe the brane universe. With the obtained results, a discussion is opened around the possibility of distinguishing observationally between general relativity and the brane universe theory. Since brane theory considers that gravity can spread to the extra dimensions (thus appearing weaker than the rest of interactions), it is possible to argue that the expected amplitude of gravitational waves according to the theory differs from the one expected in relativity.

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