deliver independent constraints on dark energy, spatial curvature, and the Hubble constant. Measurements of time delays between the multiple images become more incisive due to the standardized candle nature of the source, monitoring for months rather than years, and partial immunity to microlensing. While currently extremely rare, hundreds of such systems should be detected by upcoming time-domain surveys. Others will have the images spatially unresolved, with the observed lightcurve a superposition of time delayed image fluxes. We investigate whether unresolved images can be recognized as lensed sources given only lightcurve information and whether time delays can be extracted robustly.

We develop a method that we show can identify these systems for the case of lensed Type Ia supernovae with two images and time delays exceeding ten days. When tested on such an ensemble the method achieves a false positive rate of $\lesssim$5%, and measures the time delays with the completeness of $\gtrsim$93% and with a bias of $\lesssim$0.5% for time delay $\gtrsim$10 days. Since the method does not assume a template of any particular type of SN, the method has the potential to work on other types of lensed SNe systems and possibly on other transients.

[구 CD-05] Accurate application of Gaussian process regression for cosmology

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Gaussian process regression (GPR) is a powerful method used for model-independent analysis of cosmological observations. In GPR, it is important to decide an input mean function and hyperparameters that affect the reconstruction results. Depending on how the input mean function and hyperparameters are determined in the literature, I divide into four main applications for GPR and compare their results.

In particular, a zero mean function is commonly used as an input mean function, which may be inappropriate for reconstructing cosmological observations such as the distance modulus. Using mock data based on Pantheon compilation of type Ia supernovae, I will point out the problem of using a zero input and suggest a new way to deal with the input mean function.

[구 CD-06] Comparing Bayesian model selection with a frequentist approach using iterative method of smoothing residuals

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We have developed a frequentist approach for model selection which determines consistency of a cosmological model and the data using the distribution of likelihoods from the iterative smoothing method. Using this approach, we have shown how confidently we can distinguish different models without comparison with one another. In this current work, we compare our approach with conventional Bayesian approach based on estimation of Bayesian evidence using nested sampling for the purpose of model selection. We use simulated future Roman (formerly WFIRST)-like type Ia supernovae data in our analysis. We discuss limits of the Bayesian approach for model selection and display how our proposed frequentist approach, if implemented appropriately, can perform better in falsification of individual models.

특별세션-소형망원경네트워크

[구 STN-01] orean Small Telescope Network (소형망원경 네트워크, 소망넷)

Myungshin Im[1], Yonggi Kim[2,3], Wonseok Kang[4], Chung-Uk Lee[5], Heewon Lee[6], Soojong Pak[7], Hyunjin Shim[7], Hyun-Il Sung[5], Taewoo Kim[4], Seong-Kook J. Lee[1], Gu Lim[1], Gregory S.-H. Paek[1], Jinguk Seo[1], Joh-Na Yoon[3], Dohyeong Kim[8] and SomangNet team
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SomangNet is a project that started in 2020 with a network of ten 0.4 to 1.0 m telescopes owned by Korean institutes. By coordinating observations with multiple facilities around the world, we hope to maximize the usefulness of small telescopes which are still competitive for carrying out time-domain astronomy projects. In this talk, we will give an overview of the project, outlining SomangNet facilities, its organization, and current science projects. We hope to open SomangNet for common use in 2021B, and we will present our plan regarding the use of SomangNet.