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## [구GC-01] Direct Determination of Expansion History Using Redshift Distortions

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We investigate the direct determination of expansion history using redshift distortions without plugging into detailed cosmological parameters. The observed spectra in redshift space include a mixture of information: fluctuations of density-density and velocity-velocity spectra, and distance measures of perpendicular and parallel components to the line of sight. Unfortunately it is hard to measure all the components simultaneously without any specific prior assumption. The degeneracy breaking, between the effect of cosmic distances and redshift distortions for example, depends on the prior we assume. An alternative approach is to utilize the cosmological principle inscribed in the heart of the Friedmann-Lematre-Robertson-Walker (hereafter FLRW) universe, that is, the specific relation between the angular diameter distance and the Hubble parameter, in this degeneracy breaking.

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## [구GC-02] Spectroscopy of Early-Type Host Galaxies of Type Ia Supernovae

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The presence of dark energy, suggested from Type Ia supernovae (SNe) cosmology, is the most pronounced astronomical discovery made during the past decade. The basic assumption of this discovery is that the look-back time evolution of SNe luminosity would be negligible after light-curve correction. Several recent works, however, show that there are some differences in Hubble residual among host galaxies having different morphology and mass, indicating that SNe luminosity might be affected by population age. In order to investigate this more directly, we are continuing the YONSEI (YOnsei Nearby Supernovae Evolution Investigation) project, where we are obtaining low-resolution spectra of some 60 nearby early-type host galaxies. The early-type galaxies are preferred because the mean population ages and metallicities can be estimated from the absorption lines, and they are less affected by dust extinction. In this talk, we will report our progress in determining the ages and metallicities of host galaxies to investigate their correlation with the Hubble residual.