

distances for more than one billion stars in our Galaxy. These distance measurements would provide the important test as to the origin of the double RC in the Milky Way bulge. In this talk, we will present our preliminary results from Gaia DR2.

[구 IM-05] Evolutionary Models for Helium Giant Stars as Type Ibn Supernova Progenitors.

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Among Type I supernovae, which show no evidence for hydrogen lines in spectra, Type Ib/c supernovae lack of strong Si absorption lines and are involved with massive progenitors. While strong helium absorption lines are present in Type Ib supernovae, narrow helium emission lines also can appear in some Type Ib that are often called Type Ibn supernovae (SNe Ibn). We consider helium giant stars as a promising progenitor candidate for SN Ibn and suggest the evolutionary scenario through binary systems using MESA code.

In our models the range of primary mass is 11 - 20 solar mass, mass ratio is 0.5 - 0.9, and initial period is 1.5 / 1.7 / 2.0 / 2.5 / 3.0 day. In particular, we find that the evolution of the secondary star can overtake the primary through mass transfer from the secondary to the primary, which is so-called 'reverse case B' mass transfer. In such systems the secondary star may undergo a supernova explosion earlier than the primary star. In this case, the primary star evolves towards a single helium giant to become a SN Ibn progenitor. These cases are more frequent in relatively low initial primary mass.

[구 IM-06] Extra-tidal stars around globular clusters NGC 5024 and NGC 5053 and their chemical abundances

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NGC 5024 and NGC 5053 are among the most metal-poor globular clusters in the Milky Way. Both globular clusters are considered to be accreted from dwarf galaxies (like Sagittarius dwarf galaxy or Magellanic clouds), and common stellar envelope and tidal tails between globular clusters are also detected. We present a search for extra-tidal cluster member candidates around these globular clusters from APOGEE survey data. Using 20 chemical elements (e.g., Fe, C, Mg, Al)

and radial velocities, t-distributed stochastic neighbour embedding (t-SNE), which identifies an optimal mapping of a high-dimensional space into fewer dimensions, was explored, and we find that globular cluster stars are well separated from the field stars in 2-dimensional map from t-SNE. We also find that some stars selected in t-SNE map are placed outside of the tidal radius of the clusters. The proper motion of stars outside tidal radius is also comparable to that of globular clusters, which suggest that these stars are tidally decoupled from the globular clusters. We manually measure chemical abundances for the clusters and extra-tidal stars, and discuss the association of extra-tidal stars with the clusters.

우주론/암흑물질, 암흑에너지

[박 CD-01] Toward precise and accurate modeling of matter clustering in redshift space

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This dissertation presents the results on two-dimensional Redshift space distortion (hereafter RSD) analyses of the large-scale structure of the universe using spectroscopic data and on improvement of modeling of the RSD effect.

RSD is an effect caused by galaxies' peculiar velocity on their clustering feature in observation along the line of sight and is thus intimately connected to the growth rate of the structure in the universe, from which we can test the origin

of cosmic acceleration and Einstein's theory of gravity at cosmic scales in the end. However, there are several challenges in modeling precise and accurate RSD effect, such as non-linearities and the existence of an exotic component,

e.g. massive neutrino. As part of endeavors for modeling more precise and accurate galaxy clustering in redshift space, this dissertation includes a series of works for this issue. (More detailed descriptions were omitted.)

[구 CD-02] Testing Gravity with Cosmic Shear Data from the Deep Lens Survey

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