near-infrared wavelengths using our data from the ongoing CFHT-WIRCam RR Lyrae program.
We will discuss the systematic uncertainties involved in the calibration of these relations based on the latest Gaia EDR3 parallaxes and the implication for the cosmic distance scale.

[포 SA-04] The Kinematic Properties of Young Stars in NGC 281: its implication on star formation process (NGC 281의 젊은 별들의 운동학적 특성)

Seulgi Kim[1], Beomdu Lim[2]
[1]Sejong University, [2]Kyung Hee University

Stellar kinematics is a useful tool to understand the formation and evolution of young stellar systems. Here, we present a kinematic study of the HII region, NGC 821, using the Gaia Early Data Release 3. NGC 281 contains the open cluster IC 1590. This cluster has a core and a low-stellar density halo. We detect a pattern of cluster expansion from the Gaia proper motion vectors. Most stars radially escaping from the cluster are distributed in the halo. We measure the 1-dimensional velocity dispersion of stars in the core. The velocity dispersion (1 km/s) is comparable to the expected virial velocity dispersion of this cluster, and therefore the core is at a virial state. The core has an initial mass function shallower than that of the halo, which is indicative of mass segregation. However, there is no significant correlation between stellar masses and tangential velocities. This result suggests that the mass segregation has a primordial origin. On the other hand, it has been believed that the formation of young stars in NGC 281 West was triggered by feedback from massive stars in IC 1590. We investigate the ages of stars in the two regions, but the age difference between the two regions is not comparable to the timescale of the passage of an ionization front. Also, the proper motion vectors of the NGC 281 West stars relative to IC 1590 do not show any systematic receding motion from the cluster. Our results suggest that stars in NGC 281 West might have been formed spontaneously. In conclusion, the formation of NGC 281 can be understood in the context of hierarchical star formation model.

[포 SA-05] STaRS Gen 2: Sejong Radiative Transfer through Raman and Rayleigh Scattering in Dusty Medium

Seok-Jun Chang[1], Hee-Won Lee[1], Kwang-Il Seon[2,3]
[1]Department of Physics and Astronomy, [2]Sejong University, Korea Astronomy and Space Science Institute, [3]Astronomy and Space Science Major, University of Science and Technology

Emission features formed through Raman scattering with atomic hydrogen provide unique and crucial information to probe the distribution and kinematics of a thick neutral region illuminated by a strong far-ultraviolet radiation source. We introduce a new 3-dimensional Monte-Carlo code to describe the radiative transfer of line photons subject to Raman and Rayleigh scattering with atomic hydrogen. In our Sejong Radiative Transfer through Raman and Rayleigh Scattering (STaRS) code, the position, direction, wavelength, and polarization of each photon is traced until escape. The thick neutral scattering region is divided into multiple cells. Each cell is characterized by its velocity and density, which ensures flexibility of the code in analyzing Raman-scattered features formed in a neutral region with complicated kinematics and density distribution. We are continuously developing STaRS to adopt the absorption and scattering effect by dust. This presentation introduces STaRS and its current state and study.