[구GC-15] Dealing with gravity on galactic scales

Sascha TRIPPE
Seoul National University

I present a simple scheme for the treatment of gravitational interactions on galactic scales. In analogy with known mechanisms of quantum field theory, I assume ad hoc that gravitation is mediated by virtual exchange particles – gravitons – with very small but non-zero masses. The scheme predicts the asymptotic flattening of galactic rotation curves, the Tully-Fisher/Faber-Jackson relations, the mass discrepancy-acceleration relation of galaxies, and the surface brightness-acceleration relation of galaxies correctly; additional (dark) mass components are not required. The well-established empirical scaling laws of Modified Newtonian Dynamics follow naturally from the model. The scheme I present is not a consistent theory of gravitation; rather, it is a toy model providing a convenient scaling law that simplifies the description of gravity on galactic scales.

[구GC-16] Extragalactic Sciences from SPICA/FPC-S

Woong-Seob Jeong[1], Toshio Matsumoto[2,3], Myungshin Im[4], Hyung Mok Lee[4], Jeong-Eun Lee[5], Kohji Tsumura[3], Masayuki Tanaka[6], Takashi Shimonishi[7], Dae-Hee Lee[1], Jeonghyun Pyo[1], Sung-Joon Park[1], Bongkon Moon[1], Kwijong Park[1], Youngsik Park[1], Wonyong Han[1], Ukwon Nam[1], SPICA/FPC Team[1,2,3,4,5,6,7]
[1]Korea Astronomy and Space Science Institute, Korea, [2]ASIAA, Taiwan, [3]ISAS/JAXA, Japan, [4]Seoul National University, Korea, [5]Kyung Hee University, Korea, [6]NAOJ, Japan, [7]Kobe University, Japan

The SPICA (SPace Infrared Telescope for Cosmology & Astrophysics) project is a next-generation infrared space telescope optimized for mid- and far-infrared observation with a cryogenically cooled 3m-class telescope. The focal plane instruments onboard SPICA will enable us to resolve many astronomical key issues from the formation and evolution of galaxies to the planetary formation.

The FPC-S (Focal Plane Camera – Sciecne) is a near-infrared instrument proposed by Korea as an international collaboration. Owing to the capability of both low-resolution imaging spectroscopy and wide-band imaging with a field of view of 5′ x 5′, it has large throughput as well as high sensitivity for diffuse light compared with JWST. In order to strengthen advantages of the FPC-S, we propose the studies of probing population III stars by the measurement of cosmic near-infrared background radiation and the star formation history at high redshift by the discoveries of active star-forming galaxies. In addition to the major scientific targets, to survey large area opens a new parameter space to investigate the deep Universe. The good survey capability in the parallel imaging mode allows us to study the rare, bright objects such as quasars, bright star-forming galaxies in the early Universe as a way to understand the formation of the first objects in the Universe, and ultra-cool brown dwarfs. Observations in the warm mission will give us a unique chance to detect high-z supernovae, ices in young stellar objects (YSOs) even with low mass, the 3.3μm feature of shocked circumstance in supernova remnants. Here, we report the current status of SPICA/FPC project and its extragalactic sciences.