

## [GC-15] Dealing with gravity on galactic scales

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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.

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## [GC-16] Extragalactic Sciences from SPICA/FPC-S

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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 – Scicne) 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  $5' \times 5'$ , 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  $3.3\mu\text{m}$  feature of shocked circumstance in supernova remnants. Here, we report the current status of SPICA/FPC project and its extragalactic sciences.