[구SF-03] Radiative transfer In General grid: RIG

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We present a new code for solving non-LTE radiative transfer problems in a general grid (RIG). RIG develops from RATRAN code (Hogerheijde & van der Tak 2000) using the Accelerated Monte-Carlo method, and it can cope with line overlap effect among multiple molecular and atomic species. In this algorithm we make grids in arbitrary coordinates adequate to the problem, but, on the other hand, photons propagate in the Cartesian coordinates. For spherical, cylindrical and other well defined coordinate, the problem of tracing photon's path reduces to solving simple quadratic equations. For example, the outflow in the star formation have high dynamic range in scales from a few AU to ~ 0.1 pc and have also cylindrical symmetry. So, we have used (r, α) coordinate system, where r is the distance from the origin and α is z/ R2inthecylindricalcoordinateof(R,z). The (r, α) coordinate realizes the density - power function of r - and temperature distributions of the problems with smaller numbers of grid than the cylindrical coordinate does, and the former consumes less time to solve the problems than the latter.

[구SF-04] Star Formation Activity in Infra-Red Dark Cloud at l~53.2°

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Infra-Red Dark Clouds (IRDCs) seen silhouette against the bright Galactic background in mid-IR are a class of interstellar clouds that are dense and cold with very high column densities. While IRDCs are believed to be the precursors to massive stars and star clusters, individual IRDCs show diverse star forming activities within them. We report a remarkable example of such cloud, the IRDC at l~53.2°, and star formation activity in this cloud. The IRDC was previously identified in part as three separate, arcmin-size clouds in the catalogue of MSX IRDC candidates, but we found that the IRDC is associated with a long, filamentary CO cloud at 2 kpc from the Galactic Ring Survey data of ^{13}CO J = 1-0 emission, and that its total extent reaches ~ 30pc. The *Spitzer* MIPSGAL 24mm data show a number of reddened mid-IR sources distributed along the IRDC which are probably young stellar objects (YSOs), and the UWISH2 H_2 data (2.122mm) reveal ubiquitous out flows around them. These observations indicate that the IRDC is a site of active star formation with YSOs in various evolutionary stages. In order to investigate the nature of mid-IR sources, we have performed photometry of MIPSGAL data, and we present a catalogue of YSOs combining other available point source catalogues from optical to IR. We discuss the evolutionary stages and characteristics of YSOs from their IR colors and spectral energy distributions.