[포IM-21] Shocked H_2 Gas with Non-equilibrium Ortho-to-Para Ratios Observed from Two Supernova Remnants IC 443 and HB 21

Jong-Ho Shinn[1], Bon-Chul Koo[2], Ho-Gyu Lee[3], Dae-Sik Moon[3]
[1]*Korea Astronomy and Space Science Institute,* [2]*Seoul National University ,*[3]*University of Toronto*

We present the near-infrared spectra (2.5-5.0 um) of shocked H_2 gas, observed with the InfraRed Camera onboard the satellite AKARI. Two supernova remnants, IC 443 and HB 21, were observed, and they all showed the ortho-to-para ratios (OPRs) of less than 3.0: 2.1-2.2 for IC 443 and 1.6-1.8 for HB 21. These non-equilibrium OPRs are first reported at E(v,J) > 7000 K, as far as we are aware of. Based on our previous study, we try to interpret that the non-equilibrium OPRs originate from dissociative J-shocks. Dissociative J-shocks mainly generate infrared H_2 emissions from their H_2 reformation zone, and the OPR of 3.0 are expected for the reformed H_2 from the theoretical study. This is contradictory to our observational results. We propose other possible origins of the non-equilibrium OPRs, such as, abnormal H_2 reformation, partially dissociative J-shocks, etc.

[포IM-22] A PDR model for UV heated outflow walls around protostars

Seok Ho, Lee[1], Jeong-Eun Lee[2], and Young-Sun, Park[1]
[1] *Astronomy Program, Dept. of Physics & Astronomy, Seoul National University*
[2] *Dept. of Astronomy and Space Science, Kyung Hee University.*

We have developed a PDR code to reproduce the high rotational transitions of CO observed with Herschel-PACS. Part of these high-J CO line emission is produced by UV heated outflow walls around protostars. The local FUV radiation flux is calculated by using Monte Carlo method in (γ, α) grid taking anisotropic scattering into account. Kinetic temperature and Abundance of molecules were computed self-consistently. CO Line fluxes are calculated using RIG. We compare our PDR model with the results by Visser et al (2011) to show that the derived FUV radiation field strength can be affected by the grid resolution near the outflow wall and dust scattering.