continuum sources using the KVN 21-m telescopes as single dishes. We detected HCO+ absorption lines toward two sources. We derive HCO+ and H_2 column densities or their limits, and discuss the implications of our results.

[포 IM-04] CO Observations of H Ⅱ Regions Sh 254-258

Dong-Kyu Jung[1,2] and Kwang-Tae Kim[1]
[1]Department of Astronomy and Space Sciences, Chungnam National University.
[2]Korea Astronomy and Space Science Institute, Daejeon 305-348, Korea

The molecular clouds associated with bright optical H Ⅱ regions Sh 254-258 are studied with the TRAO CO observations and with the WISE near-infrared emission. Based on the morphology of the clouds and the basic physical parameters derived with the LTE analysis, Pieces of evidences for physical interactions with its surroundings are investigated.

[포 IM-05] Molecular environments of a Planck Cold Clump: G108.8-00.8

Jungha Kim[1], Jeong-Eun Lee[1], Tie Liu2, Kee-Tae Kim[2], Karl Menten[3], Yuefang Wu4, Mark Thompson[5], and Sheng-Yuan[6]
[1]School of Space Research, Kyung Hee University, Korea
[2]Korea Astronomy and Space Science Institute (KASI), Korea
[3]Max-Planck-Institute für Radioastronomie, Germany
4Department of Astronomy, Peking University, China
[5]Centre for Astrophysics Research, Science & Technology research Institute, University of Hertfordshire, UK
[6]Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), Taiwan

We present preliminary results from a series of observations toward G108.8-00.8, which is one of Planck Cold Clumps and a promising candidate of massive prestellar cores. In the integrated intensity map of SCUBA 850 micron dust continuum emission, highly fragmented structures appear. These are distributed along one long filamentary structure seen in the CO 1-0 and 13CO 1-0 integrated intensity maps obtained with the PMO 13.7 m telescope. The northern part of the filament is divided into two parts, as seen in the CO 2-1, 13CO 2-1, and C18O 2-1 integrated intensity maps obtained with the CSO 10 m telescope. The observations of HCO+ 1-0, N2H+ 1-0, and HCN 1-0 with the IRAM 30 m telescope focus on the northern part of the CSO maps, which show a head-tail structure. NH3 (1,1) also shows similar distribution with IRAM maps. The depletion factors, derived by the comparison between the dust continuum and C18O 2-1 emission, varies from 1.5 to 6 over the region, suggesting different evolutionary status of each component. To study the chemical and physical environments of G108.8-00.8, more detailed analysis is in progress.

[포 IM-06] Blue excesses in different evolutionary stages of massive star-forming regions

Mihwa Jin[1], Jeong-Eun Lee1, Kee-Tae Kim[2]
[1]Kyunghee University (KHU), [2]Korea Astronomy and Space science Institute (KASI)

We analyzed both HCN J=1-0 and HNC J=1-0 line profiles to study the inflow motions in different evolutionary stages of massive star formation; infrared dark clouds (IRDCs), high-mass protostellar object (HMPOs), and ultra-compact HII regions (UCHIIs). The infall asymmetry in HCN spectra seems to be prevalent throughout all the three evolutionary phases, with IRDCs showing the largest excess in blue profile. In the case of HNC spectra, the prevalence of blue sources does not appear, excepting for IRDCs. We suggest that this line is not appropriate to trace infall motion in evolved stages of massive star formation because of an astrochemical effect. This result spotlights the importance of considering chemistry in dynamical study in star-forming regions. The fact that the IRDCs show the highest blue excess in both infall tracers indicates that the most active infall occurs in the early phase of star formation, i.e., the IRDC phase rather than in the later phases. However, the UCHIIs is likely still accreting matters. We also found that the absorption dips of the HNC spectra in all blue sources are red--shifted relative to their central velocities. These red-shifted absorption dips may indicate the observational signature of overall collapse although observations with better resolutions are needed to examine this feature more in detail.

[포 IM-07] 광대역 TRAO CO 관측: 분자운 충돌

Kim, Youngsik[1,2], Kim, Kwang. Tae[1] and Lee, Youngung[2]

[1]*Department of Astronomy and Space Sciences Chungnam National University.* [2]*Korea Astronomy and Space Science Institute, Daejeon 305-348, Korea*

분자운의 광대역 분포는 작은 영역에서는 볼 수 없는 독특한 모습을 보여준다. 본 연구는 2010년도 TRAO 관측으로 얻는 외은하면의 4.3°x2°의 광대역 데이터를 사용해서 광대역 분자운 분포의 특성을 분석했다. 광대역 분자운들은 형태학적 특징에 의거해서 네 종류로 분류되었다: chain, twisted filament, speckle, cluster suspect 이들의 특징을 간략히 소개하고 광대역 분자운들을 보는 새 관점으로 분자운 충돌 이론을 소개한다. 그와 함께 광대역 연구의 대표적인 예로 두 전파원을 소개한다. 첫째는 CTB 109 (3C 434.1) 근처 분자운이며, 길다란 CO filament가 포함된다. 둘째는 "집게벌레(S157 ab 포함)"로서 강한 별 탄생을 보여주는 특이한 영역으로서 강한 CO emission이 두 개 twisted filament 구조를 보여준다. 연구에는 DRAO HI, IRAS 적외선 자료, DRAO Radio continuum data를 사용했고, CO 자료를 통해서 분자운의 질량과 밀도, 온도 등의 기본 물리량을 계산했다.

[포 IM-08] Tracing the earliest phases of star formation: A pilot survey of Planck Cold Clumps

Hee-Weon Yi[1], Jeong-Eun Lee[1], Tie Liu[2], Kee-Tae Kim[2], and Yuefang Wu[3]
[1]*School of Space Research, Kyung Hee University, Yongin-Si, Gyeonggi-Do 446-701, Republic of Korea*
[2]*Korea Astronomy and Space Science Institute, 776 Daedeokdae-ro, Yuseong-gu, Daejeon 34055, Republic of Korea*
[3]*Department of Astronomy, Peking University, 100871, Beijing China*

We observed 38 Planck Cold Clumps (PCCs) in the 850 μm dust continuum emission using the JCMT/SCUBA-2, and detected the emission in 15 clumps containing dense cores. In this poster we present the preliminary results. The PCCs are cold, dense, and thus, they are considered as objects in the early evolutionary stages of star formation. The sources in our sample were selected based on the Purple Mountain Observatory (PMO) 13CO (1-0) integrated intensity maps. In order to examine whether these cores detected in 850 μm continuum have potential to be prestellar cores, we compare each core mass estimated from the 850 μm continuum with the Virial mass and Bonnor-Ebert (BE) mass calculated from the 13CO (1-0) or C18O (1-0) spectra. By comparing the two column densities from the dust continuum and the 13CO (1-0) or C18O (1-0) line, we also derive the CO depletion factor, which could be an indicator of core evolution. The moment maps of the 13CO (1-0) line are used to study the physical properties (e.g. kinematics, turbulence) of PCCs. We investigate difference between the sources with and without detectable 850 μm emission to study the formation conditions of dense cores.

[포 IM-09] The dynamical evolution of very dense star clusters in a very strong tidal field

So-Myoung Park[1], Simon P. Goodwin[2], Sungsoo S. Kim[3]
[1]*School of Space Research, Kyung Hee University,*
[2]*Department of Physics and Astronomy, University of Sheffield*
[3]*Department of Astronomy and Space Science, Kyung Hee University*

Within 100 pc of the Galactic Centre the tidal field is extremely strong. We investigate the survival of star clusters of different masses in strong tidal fields. We show that dense low-mass clusters are destroyed by strong tidal fields as the tidal fields add energy to the cluster. Only massive clusters (like the Arches) can survive for more than 1-2 Myr in strong tidal fields. Therefore, in Galactic Centre environments only massive young clusters should ever be observed.

천문우주관측기술

[포 AT-01] Final Results of APG-15 5th meeting

HyunSoo Chung[1], Jun-Cheol Moon[2], Dai-Hyuk YU[3], Do-Heung Je[1], Jung-Hyun Jo[1], Duk-Gyoo Roh[1], Se-Jin Oh[1], Bong-Won Sohn[1], SangSung Lee[1], Hyo-Ryung Kim[1]
[1]*KASI* [2]*RRA* [3]*KRISS*

국제전기통신연합 (ITU)에서 주관하여 2015년 11월 2일-27일 스위스 제네바에서 개최되는 WRC-15(세계전파통신회의, World Radiocommunication Conference)회의에서는 28개 의제에 대해서는 의제별 주파수대역별로 국제전파규칙(Radio Regulations)을 개정하게 된다.

WRC-15 본회의에는 200여개 ITU회원국의 국가대표 3,000여명이 모여서 회의를 진행하게 되며, 원활한 회의 진행과 의견 결정을 위하여 각 국가별 제안서 제출은 지양하고, 해당 지역별 국가들의 공동제안서를 중심으로 논의하게 된다. ITU에는 현재 6개의 지역(유럽, 러시아, 아랍, 북남미, 아프리카 및 아태지역) 공동체가 등록되어 있으며, 아태지역은 아태지역 전파통신협의체(Asia-Pacipic