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Thermal inflation is an additional inflationary mechanism before the big bang nucleosynthesis, which solves the moduli problem and naturally provides a plausible dark matter candidate. Thermal inflation leaves a slight enhancement followed by huge suppression of a factor of ~50 in the curvature and matter power spectrum, which can be expressed in terms of a single characteristic scale k_b. Here we describe the observability of the small-scale features of thermal inflation from various observations, such as CMB distortion, satellite galaxy abundance in the Milky-Way-sized galaxies, and 21-cm power spectrum before the epoch of reionization.

성간물질/별생성/우리은하

[포 IM-01] BISTRO and BISTRO-2

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The B-fields In STar-forming Region Observations (BISTRO) is the 3-year large program of the James Clerk Maxwell Telescope (JCMT) using SCUBA-2 and POL-2, started in 2016. We aim to study the roles of magnetic fields in star formation by observing 16 fields of nearby star forming regions, e.g., Orion and Ophiuchus molecular clouds. The angular resolution and wavelength provided by JCMT (14 arcsecond at 850 micrometer) is ideal to investigate the intermediate scales of magnetic fields (1000-10000 au) associated in cold dense cores and filaments. This year, moreover, we were awarded JCMT time for additional 16 fields (BISTRO-2), which allows us to cover broader physical properties of star forming regions. We report the current status of BISTRO and introduce BISTRO-2.

Note: (PI) D. Ward-Thompson, (co-PIs) P. Bastien, T. Hasegawa, W. Kwon, S. Lai, and K. Qiu

[포 IM-02] Filament, the Universal Nersery of Stars: Progress Report on TRAO Survery of Nearby Filamentary Filamentary Molecular Clouds

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To dynamically and chemically understand how filaments, dense cores, and stars form under different environments, we are conducting a systematic mapping survey of nearby molecular clouds using the TRAO 14 m telescope with high (N_2H^+ 1-0, HCO^+ 1-0, SO 32-21, and NH_2D v=1-0) and low (^{13}CO 1-0, $C^{18}O$ 1-0) density tracers. The goals of this survey are to obtain the velocity distribution of low dense filaments and their dense cores for the study of their origin of the formation, to understand whether the dense cores form from any radial accretion or inward motions toward dense cores from their surrounding filaments, and to study the chemical differentiation of the filaments and the dense cores. Until the 2017A season, the real OTF observation time is ~760 hours. We have almost completed mapping observation with four molecular lines (^{13}CO 1-0, $C^{18}O$ 1-0, N_2H^+ 1-0, and HCO^+ 1-0) on the six regions of molecular clouds (L1251 of Cepheus, Perseus West, Polaris South, BISTRO region of Serpens, California, and Orion B). The cube data for ^{3}CO and $C^{18}O$ lines were obtained for a total of 6 targets, 57 tiles, 676 maps, and 7.1 deg^2. And N_2H^+ and HCO^+ data were added for 2.2 deg^2 of dense regions. All OTF data were regridded to a cell size of 44 by 44 arcseconds. The ^{13}CO and $C^{18}O$ data show the RMS noise level of about (0.1-0.2) K and N_2H^+ and HCO^+ data show about (0.07-0.2) K at the velocity resolution of 0.06 km/s. Additional observations will be made on some regions that have not reached the noise level for analysis. To identify filaments, we are using and testing programs (DisPerSE, Dendrogram, FIVE) and visual inspection for 3D image of cube data. A basic analysis of the physical and chemical properties of each filament is underway.

[포 IM-03] Turbulent Properties in the Orion A and ρ Ophiuchus molecular clouds: Observations and preliminary results

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