select a best pixel resolution for estimating the magnetic field distribution. The pixel resolution should be larger than a radius of curvature. We selected that 20 or 24″ pixel resolutions are good choices towards Orion A region.

[구 IM-09] Effect of turbulence driving and sonic Mach number on Davis-Chandrasekhar-Fermi method

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Davis-Chandrasekhar-Fermi (DCF) method is a tool that is widely used to obtain the strength of the mean magnetic field projected on the plane of the sky. When there are independent eddies along the line of sight, the variation of polarization angle will decrease by the averaging effect. Therefore, the measured strength of the magnetic field can be overestimated. Cho & Yoo (2016) proposed a modified DCF method considering such effect. By using this, we quantitatively compared the results from the conventional DCF and the modified DCF methods for various sonic Mach numbers and driving schemes (the solenoidal and compressive driving).

Here, we present that the modified DCF method does not show a strong dependence on the sonic Mach number or driving schemes either, while the conventional DCF method depends on the sonic Mach number for the compressive driving scheme.

[구 IM-10] Study of Magnetohydrodynamic Turbulence Using Multi-frequency Synchrotron Polarization Observations

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Turbulent motions perturb magnetic field lines and produce magnetic fluctuations. The perturbations leave imprints of turbulence statistics on magnetic field. Observation of synchrotron radiation is one of the easiest ways to study turbulent magnetic field. First, we obtained the spatial spectrum of synchrotron polarization so that shows how the spectrum is affected by Faraday rotation and how to recover the statistics of underlying turbulence magnetic field. Since polarized synchrotron intensity arising from magnetized turbulence are anisotropic along the direction of mean magnetic field. Secondly, we studied quadrupole ratio to quantitatively describe the degree of anisotropy introduced by magnetic field at multi-wavelengths. This work demonstrated that the spectrum and quadrupole ratio of synchrotron polarization can be very informative tools to get detailed information about the statistical properties of MHD turbulence from radio observations of diffuse synchrotron polarization.

[구 IM-11] Discovery of a New Mechanism of Dust Destruction in Strong Radiation Fields and Implications

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Massive stars, supernovae, and kilonovae are among the most luminous radiation sources in the universe. Observations usually show near- to mid-infrared (NIR-MIR, 1-5~micron) emission excess from H II regions around young massive star clusters (YMSCs) and anomalous dust extinction and polarization towards Type Ia supernova (SNe Ia). The popular explanation for such NIR-MIR excess and unusual dust properties is the predominance of small grains (size a<0.05micron) relative to large grains (a>0.1micron) in the local environment of these strong radiation sources. The question of why small grains are predominant in these environments remains a mystery. Here we report a new mechanism of dust destruction based on centrifugal stress within extremely fast rotating grains spun-up by radiative torques, namely the RAdiative Torque Disruption (RATD) mechanism, which can resolve this question. We find that RATD can destroy large grains located within a distance of ~ 1 pc from a massive star of luminosity L~ 10^4L_sun and a supernova. This increases the abundance of small grains relative to large grains and successfully reproduces the observed NIR-MIR excess and anomalous dust extinction/polarization. We show that small grains produced by RATD can also explain the steep far-UV rise in extinction curves toward starburst and high redshift galaxies, as well as the decrease of the escape fraction of Ly-alpha photons observed from HII regions surrounding YMSCs.

[구 IM-12] Near-infrared Spectroscopy of Metal-enriched Supernova Ejecta in Cassiopeia A

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The supernova remnant Cassiopeia A (Cas A) provides a unique opportunity to observe the fine