Decoding Galactic Evolution through the Interplay of the Multi-Phase Interstellar Medium

closing discussion

- Total 54 oral, 27 poster presentations, 4 days of intensive discussions

- Diversity of topics: different themes, different methods, and different technics

- This diversity itself is a strength to see the physics of ISM from multiple perspectives.

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closing discussion

- Phases of the ISM
  - atomic, molecular, ionized, PDR, dust, PAH, magnetic fields, heavy elements, CR
- Multiscale nature
  - from pc-scale clouds, 100-pc-scale GMCs
  - galactic nuclei, bar and spiral arms, bubbles and super giant shells
  - interacting galaxies, mergers to galaxy clusters
- Physical properties
  - Spectroscopic diagnostics, (shock) velocity field, and spectral index to be linked with the ISM structures
- Interplay of ISM
  - dynamics: collision, expansion, compression, acceleration, deceleration
  - via: inflow, outflow, jet, wind, radiation, ionization, shock wave, gravity, conduction, chemical reaction

New tools and perspectives

- Theory
  - Simulations with higher resolution/dynamic ranges, more basic equations, many initial conditions
  - Advanced analysis: statistics, machine learning
- Observations
  - ALMA, JWST, SKA pathfinder, eROSITA, Gaia
  - HST, VLA, Galex, MaNGA, IGRINS, APEX, Sofia, Nobeyama 45m, NANTEN2, DeMCELS, LVM, XMM, Fermi, NuSTAR, HESS, Voyager, etc...
- Future
  - HWO, ALMA2040, NewAthena, CTA

Diverse Open Questions to be addressed

- How molecular clouds are formed?
- How young massive clusters are formed?
- Difference in the CR flux and spacial scales in the Galaxy
- Understand all physical processes of life cycle of the matter.
- Is IMF universal?
- AGN activity in nearby universe to affect the baryon cycle.
- Positive feedback of HII regions on SF.
- Is dense gas important for galaxy evolution?
- Different Ionization mechanisms.
- Gas accretion onto the galactic disk from warm halo.

Summary

- The ISM is “multiphase” and interplaying
- In order to disclose it nature,
- we (astronomers) should be multi-phase (multi-wavelength, multi-scale, multi-perspective view etc.), too,
- and should interplay each other, and combine our ideas.
- Multi-phase is multi-generation. Many presentation from young researchers and students.
- This conference is a Kick-Off of collaborations. Let’s interact all together! Thank you.

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