Lyα blobs are mysterious, giant (~100 kpc), glowing gas clouds in the distant universe.

They occupy the dark matter halos that will evolve into the richest groups and clusters today. The blob's gas may be the proto-intracluster medium and their embedded galaxies are considered as the progenitors of massive cluster galaxies. Yet we do not know why Lyα blobs glow. There are evidences of kinematic measurements to exclude shocks and winds from AGN or starbursts as a power source, suggesting that photoionizing radiation or scattering of Lyα photons might be responsible. Polarization mapping can discriminate between these photo-ionization and scattering. Previous results of imaging polarimetry for Lyα nebulae are roughly consistent with scattering models. However the polarization morphologies in those of previous results are all different, motivating our polarimetric survey of Lyα nebulae for the statisticallymeaningful sample. As initial results of our survey, we present the total polarization map of the LABd05 which has the spatial offset between the peak of Lyα surface brightness and an obscured AGN. We detect the significant polarization in this target with the radially increasing polarization gradient, suggesting that scattering plays major role within this nebula. The polarization pattern is more aligned with the Lyα peak rather than the AGN (the potential energy source), indicating that the Lyα photons are originated from the region near the peak of Ly α intensity.

[구 GC-15] Impact of Lyman alpha pressure on metal-poor dwarf galaxies

Taysun Kimm[1], Martin Haehnelt[2], Jeremy Blaizot[3], Harley Katz[2], Leo Michel-Dansac[3], Thibault Garel[3], Joakim Rosdahl[3], Romain Teyssier[4]
[1]Yonsei university, [2]University of Cambridge, [3]Universite Lyon, [4]University of Zurich

Understanding the origin of strong galactic outflows and the suppression of star formation in dwarf galaxies is a key problem in galaxy formation. Using a set of radiation-hydrodynamic simulations of an isolated dwarf galaxy, we show that the momentum transferred from resonantly scattered Lyman-alpha(LyA) photons can suppress star formation by a factor of two in metal-poor galaxies by regulating the dynamics of star-forming clouds before the onset of supernova explosions (SNe). This is possible because each LyA photon resonantly scatters and imparts ~10-300 times greater momentum than in the single scattering limit. Consequently, the number of star clusters predicted in the simulations is reduced by a factor of ~5, compared to the model without the early feedback. More importantly, we find that galactic outflows become weaker in the presence of strong LyA radiation feedback, as star formation and associated SNe become less bursty. We also examine a model in which radiation field is arbitrarily enhanced by a factor of up to 10, and reach the same conclusion. The typical mass-loading factors in our metal-poor dwarf system are estimated to be ~5-10 near the mid-plane, while it is reduced to ~1 at larger radii.

[구 GC-16] Polarization as a Probe of Thick Dust Disk in Edge-on Galaxies: Application to NGC 891

Kwang-Il Seon (선광일)
Korea Astronomy & Space Science Institute (한국천문연구원)

Radiative transfer models were developed to understand the optical polarizations in edge-on galaxies, which are observed to occur even outside the geometrically thin dust disk, with a scale height of ~0.2 kpc. In order to reproduce the vertically extended polarization structure, we find it is essential to include a geometrically thick dust layer in the radiative transfer model, in addition to the commonly-known thin dust layer. The models include polarizations due to both dust scattering and dichroic extinction which is responsible for the observed interstellar polarization in the Milky Way. It is found that the magnetic fields in edge-on galaxies are in general vertical (or poloidal) except the central part, where the magnetic fields are mainly toroidal. We also find that the polarization level is enhanced if the clumpiness of the interstellar medium, and the dichroic extinction by vertical magnetic fields in the outer regions of the dust lane are included in the radiative transfer model. The predicted degree of polarization outside the dust lane was found to be consistent with that (ranging from 1% to 4%) observed in NGC 891.

[구 GC-17] The 105-month Swift-BAT all-sky hard X-ray survey

Kyuseok Oh[1,2], Michael Koss[3], Craig B. Markwardt[4], Kevin Schawinski[2], Wayne H. Baumgartner[4], Scott D. Barthelmy[4], Bradley Cenko[4], Neil Gehrels[4], Richard Mushotzky[5], Abigail Petulante[5], Claudio Ricci[6], Amy Lien[4,7], Benny Trakhtenbrot[2]
[1]Kyoto University, [2]ETH Zurich, [3]Eureka Scientific, [4]NASA GSFC, [5]University of Maryland, [6]Pontificia Universidad Catolica de Chile, [7]Center for Research and Exploration in Space Science and Technology

We present a new catalog of hard X-ray sources