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Accepted Abstracts - Submitted Abstracts - Thesis Abstracts
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From the Editor

Welcome to all the new subscribers, and thanks to everyone who contributed to this issue of the Active Galaxies Newsletter.

This newsletter is intended to disseminate paper abstracts, meeting announcements, job adverts and other information which may be of interest to the active galaxies community. It is produced monthly and, whilst the deadline for contributions is the last day of the month, contributions may be submitted at any time.

The Latex macros for submitting abstracts and dissertation abstracts are appended to each issue of the newsletter and are also available on the web page. Please note that the editor may reject submissions which do not use the template. As always, any suggestions or feedback regarding the newsletter are welcome.

Thanks for your continued subscription.

Megan Argo

Abstracts of recently accepted papers

Soft X-Ray Excess from Shocked Accreting Plasma in Active Galactic Nuclei

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We propose a novel theoretical model to describe a physical identity of the soft X-ray excess, ubiquitously detected in many Seyfert galaxies, by considering a steady-state, axisymmetric plasma accretion within the innermost stable circular orbit (ISCO) around a black hole (BH) accretion disk. We extend our earlier theoretical investigations on general relativistic magnetohydrodynamic (GRMHD) accretion which has implied that the accreting plasma can develop into a standing shock for suitable physical conditions causing the downstream flow to be sufficiently hot due to shock compression. We numerically calculate to examine, for sets of fiducial plasma parameters, a physical nature of fast MHD shocks under strong gravity for different BH spins. We show that thermal seed photons from the standard accretion disk can be effectively Compton up-scattered by the energized sub-relativistic electrons in the hot downstream plasma to produce the soft excess feature in X-rays. As a case study, we construct a three-parameter Comptonization model of inclination angle $\theta_{\rm obs}$, disk photon temperature $kT_{\rm in}$ and downstream electron energy kT_e to calculate the predicted spectra in comparison with a 60 ks *XMM-Newton*/EPIC-pn spectrum of a typical radio-quiet Seyfert 1 AGN, Ark 120. Our χ^2-analyses demonstrate that the model is plausible in successfully describing data for both non-spinning and spinning BHs with the derived range of 61.3 keV $\lesssim kT_e \lesssim$ 144.3 keV, 21.6 eV $\lesssim kT_{\rm in} \lesssim$ 34.0 eV and $17.5^\circ \lesssim \theta_{\rm obs} \lesssim 42.6^\circ$ indicating a compact Comptonizing region of $3-4$ gravitational radii that resembles the putative X-ray coronae.

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Preprint available at http://adsabs.harvard.edu/abs/2016arXiv160601851F

Theoretical reevaluations of the black hole mass – bulge mass relation - I. Effect of the seed black hole mass

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We explore the effect of varying the mass of the seed black hole on the resulting black hole mass – bulge mass relation at $z \sim 0$, using a semi-analytic model of galaxy formation combined with large cosmological N-body simulations. We constrain our model by requiring the observed properties of galaxies at $z \sim 0$ are reproduced. In keeping with previous semi-analytic models, we place a seed black hole immediately after a galaxy forms. When the mass of the seed is set at $10^5 M_\odot$, we find that the model results become inconsistent with recent observational results of the black hole mass – bulge mass relation for dwarf galaxies. In particular, the model predicts that bulges with $\sim 10^9 M_\odot$ harbour larger black holes than observed. On the other hand, when we employ seed black holes with $10^3 M_\odot$, or randomly select their mass within a $10^{3-5} M_\odot$ range, the resulting relation is consistent with observation estimates, including the observed dispersion. We find that to obtain stronger constraints on the mass of seed black holes, observations of less massive bulges at $z \sim 0$ are a more powerful comparison than the relations at higher redshifts.

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Preprint available at http://arxiv.org/abs/1604.05317

Upholding the Unified Model for Active Galactic Nuclei: VLT/FORS2 Spectropolarimetry of Seyfert 2 galaxies

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The origin of the unification model for Active Galactic Nuclei (AGN) was the detection of broad hydrogen recombination lines in the optical polarized spectrum of the Seyfert 2 galaxy (Sy2) NGC 1068. Since then, a search for the hidden broad-line region (HBLR) of nearby Sy2s started, but polarized broad lines have only been detected in ∼30–40% of the nearby Sy2s observed to date. Here we present new VLT/FORS2 optical spectropolarimetry of a sample of 15 Sy2s, including Compton-thin and Compton-thick sources. The sample includes six galaxies without previously published spectropolarimetry, some of them normally treated as non-hidden BLR (NHBLR) objects in the literature, four classified as NHBLR, and five as HBLR based on previous data. We report $\geq 4\sigma$ detections of a HBLR in 11 of these galaxies (73% of the sample) and a tentative detection in NGC 5793, which is Compton-thick according to the analysis of X-ray data performed here. Our results confirm that at least some NHBLRs are misclassified, bringing previous publications reporting differences between HBLR and NHBLR objects into question. We detect broad Hα and Hβ components in polarized light for 10 targets, and just broad Hα for NGC 5793 and NGC 6300, with line widths ranging between 2100 and 9600 km s^{-1}. High bolometric luminosities and low column densities are associated with higher polarization degrees, but not necessarily with the detection of the scattered broad components.

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Preprint available at http://arxiv.org/abs/1606.02204

A growth-rate indicator for Compton-thick active galactic nuclei

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Due to their heavily obscured central engines, the growth rate of Compton-thick (CT) active galactic nuclei (AGN) is difficult to measure. A statistically significant correlation between the Eddington ratio, $\lambda_{\rm Edd}$, and the X-ray power-law index, Γ, observed in unobscured AGN offers an estimate of their growth rate from X-ray spectroscopy (albeit with large scatter). However, since X-rays undergo reprocessing by Compton scattering and photoelectric absorption when the line-of-sight to the central engine is heavily obscured, the recovery of the intrinsic Γ is challenging. Here we study a sample of local, predominantly Compton-thick megamaser AGN, where the black hole mass, and thus Eddington luminosity, are well known. We compile results on X-ray spectral fitting of these sources with sensitive high-energy ($E > 10$ keV) *NuSTAR* data, where X-ray torus models which take into account the reprocessing effects have been used to recover the intrinsic Γ values and X-ray luminosities, $L_{\rm X}$. With a simple bolometric correction to $L_{\rm X}$ to calculate $\lambda_{\rm Edd}$, we find a statistically significant correlation between Γ and $\lambda_{\rm Edd}$ ($p = 0.007$). A linear fit to the data yields $\Gamma = (0.41 \pm 0.18)\log_{10}\lambda_{\rm Edd} + (2.38 \pm 0.20)$, which is statistically consistent with results for unobscured AGN. This result implies that torus modeling successfully recovers the intrinsic AGN parameters. Since the megamasers have low-mass black holes ($M_{\rm BH} \approx 10^6 - 10^7\ M_\odot$) and are highly inclined, our results extend the Γ-$\lambda_{\rm Edd}$ relationship to lower masses and argue against strong orientation effects in the corona, in support of AGN unification. Finally this result supports the use of Γ as a growth-rate indicator for accreting black holes, even for Compton-thick AGN.

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E-mail contact: murray@srl.caltech.edu
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Jobs

Postdoctoral Position
Seoul National University
Deadline: open until filled

Email contact: woo@astro.snu.ac.kr
Further Information: http://astro2.snu.ac.kr

Applications are invited for two post-doctoral research positions at Seoul National University. Successful candidates will work with Prof. Jong-Hak Woo and his research group to carry out research projects, i.e., 1) gas outflows based on IFU data, and 2) AGN variability and reverberation mapping project. Various research topics on AGNs and galaxy evolution are also available. Preference will be given to those who have experience in AGN-related topics and/or spectroscopic data analysis. Substantial amount of time for independent research will be available.

Astronomy Department at SNU provides a lively research environment. Currently, 12 faculty members (including 2 non-Koreans), and 60 graduate students are actively working on a broad range of topics. Postdoc researchers can work with graduate and undergraduate students in various levels. Korean community has various observational facilities, including access to ALMA and JCMT through EAO, and Gemini telescopes based on short-term contract.

Applicants must hold a Ph.D. degree or equivalent in astronomy. The duration of this position is 2 + 2 years, contingent upon satisfactory research performance. University-subsidized housing is available on campus for monthly rent of 500-600 USD. Travel support and research budget will be also provided.

Two positions are available, but the starting date is negotiable. Applications will be evaluated immediately and applications will be accepted until the positions are filled. Applicants should submit CV, publication list, research summary, research plan, and three letters of reference to woo at astro.snu.ac.kr. Early submission is also encouraged.

Please feel free to contact Jong-Hak Woo if you need further information.