

Probing ISM properties and AGN feedback in the $z=0-4$ Universe with IRAM (and ALMA)

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We have recently performed a survey with the IRAM 30m to probe molecular gas properties in IBIS-CO galaxies, an unbiased sample of ~ 60 hard X-ray selected, IBIS-INTEGRAL AGN at $z \sim 0-01-0.03$ with $L_{\text{bol}} \sim 10^{43}-10^{46}$ erg/s. CO(1-0) and CO(2-1) observations revealed that AGN activity is able to affect the molecular gas reservoirs. IBIS-CO hosts show indeed lower gas fractions compared to parent samples of non-active galaxies. Moreover, ALMA CO(2-1) follow-up observations allowed us to probe the molecular gas kinematics down to 50-100 pc scales, detect and accurately map off-planar gas motions, such as AGN-driven outflows, in these sources.

We have also benefited from IRAM NOEMA CO and millimeter continuum observations to the first systematic study of molecular gas and ISM properties in the host-galaxies of WISE/SDSS selected hyperluminous (WISSH) quasars, i.e. the most luminous quasars in the $z \sim 2-4$ Universe ($L_{\text{bol}} > 10^{47}$ erg/s), where the impact of AGN feedback is expected to be maximised. These sources show extreme (AGN-corrected) star formation rates of 500-1000 M_{sun}/yr , able to exhaust molecular fuel in few Myr. Moreover, the combination of NOEMA + ALMA and JVLA observations revealed to be a unique tool in probing the assembly of quasars host galaxies. Indeed we find that a huge ($>75\%$) fraction of hyperluminous quasars “is in good company” of massive, nearby (< 30 kpc) companions.

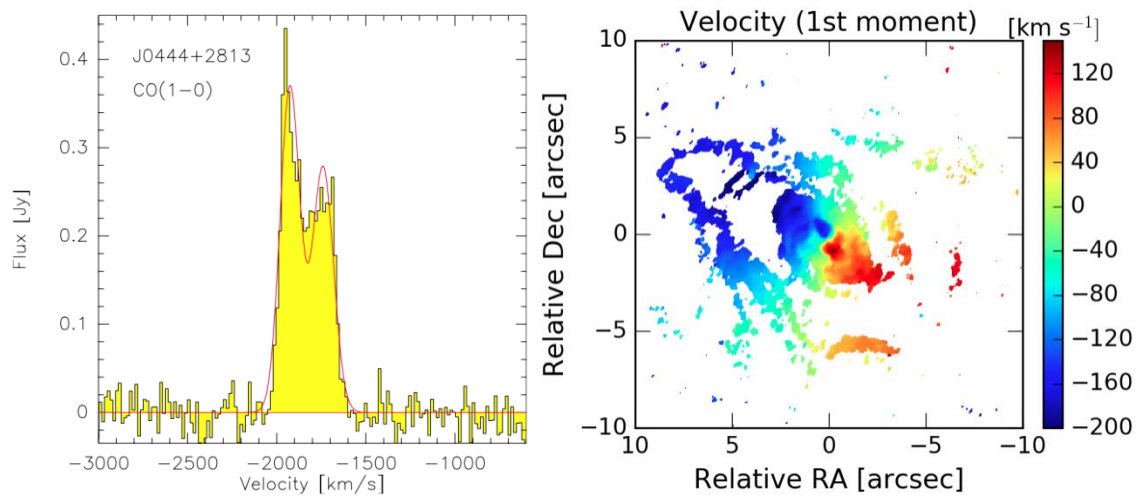


Figure 1. IRAM 30m CO(1-0) spectrum (left) and ALMA CO(2-1) velocity map (right) of IBISCO galaxy J0444+2813.