Two-Face(s): ionized and neutral gas winds in the local Universe.

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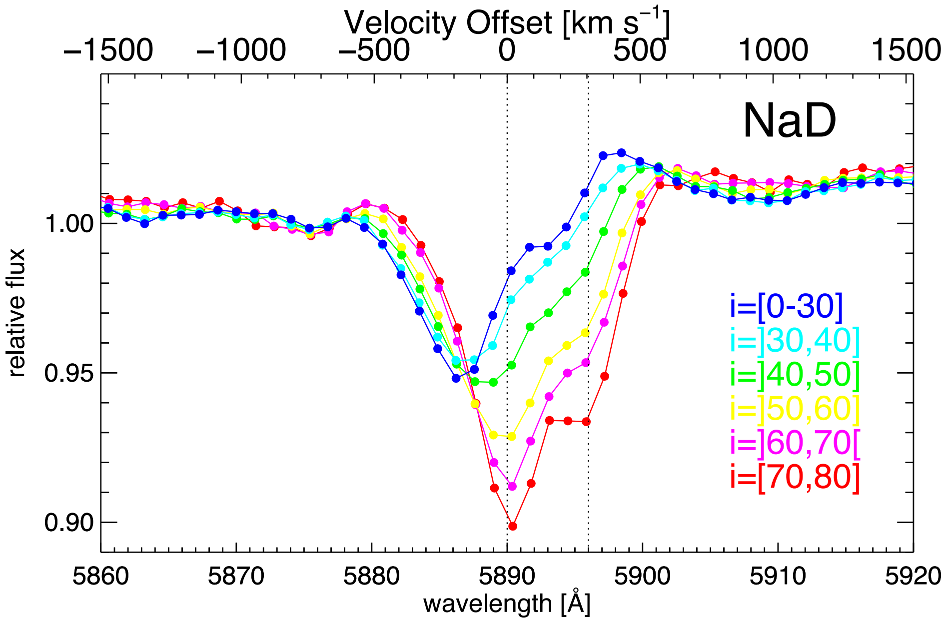
[Aims and Methods] The physical mechanism(s) driving the "quenching" of the star formation activity in galaxies, remains one of the least understood puzzles in the galaxy formation theoretical framework. According to the most recent theoretical models,both the energetic feedback from active galactic nuclei (AGN) and the star formation activity (SF) itself are believed to provide effective mechanisms to eject the gas away from the galaxy by powerful winds. In order to unmasking the nature of these two quenching processes (AGN and SF), we analyzed a complete spectroscopic galaxy sample ($\sim$ 600000 spectra) drawn from the SDSS to look for evidence of galactic winds in the local Universe. We focused on the shape of the [OIII]λ5007 emission line and interstellar Na I $\lambda 5890, 5895$ (Na D) resonant line profiles as tracers of ionizing and neutral gas outflows, respectively.

Figure 1: Variation of the ISM Na D resonant line profile as a function of the galaxy inclination for the galaxies with SFR$\geq$ 10 $M_\odot/yr$ including "Pure" SF galaxies and galaxies with an AGN contributions. The line is perfect centred to the systemic velocity in the edge-on sample (red curve) and it shown a progressive blue-shift according with the decrease of the mean disk inclination. The maximum shift is reached by the more face-on galaxies (blue curve).



[Results] We find that, statistically, only galaxy in the LIGRs regime, SFR$> 10 M_\odot/yr$, present clear evidence of neutral gas winds, with velocities that exceed the instrumental SDSS resolution ($\Delta V > 70$ km/s). By studying this particular sub-sample we find: a) the ISM Na D absorption lines show a clear transition from a strong disk-like component, perfectly centered to the systemic velocity, in the edge-on system (inclination $i > 50°$ of the disk rotation axis), to an outflow, blue-shifted, component in face-on galaxies ($i < 50°$; b) these trends are observed in galaxies classified as "purely" star-forming and AGN dominated objects.
In addition, we compare the kinematics of the neutral gas with the kinematics of the ionized gas as traced by the [OIII]λ5007 emission lines. We find that, in these high SFR galaxies, the perturbations of the [OIII] emission line are present only in AGN or composite AGN/star-forming systems. The observed maximum velocities of both, the Na D and [OIII] outflows are well below the escape velocity of such galaxies.
We conclude then, that the main effect of these "Light breeze" is to lift up part of the gas above the disk rather than letting it escape the galaxy or taking it far away in the Circum-Galactic Medium.