Francesco Tombesi (NASA/GSFC & UMD)
Ultra-fast outflows in radio-quiet AGNs

- NGC 4051 (v~0.1c) - (Tombesi et al. 2010a)
- PG1211+143 (z=0.08) (v~0.1c) - (Pounds et al. 2003)
- PDS 456 (v~0.25c) - (Reeves et al. 2009)
Observations of winds at different scales in Seyferts

Accretion disk scales

Galaxy scales

~1pc

WAs

UFOs

UFO feedback

(Tombesi et al. 2013)

(Ohsuga et al. 2009)

(Wagner et al. 2013)
Parameters of UFOs in radio-quiet Seyferts (XMM)

- UFOs detected in >40% of the sources, not collimated
- Distance $\sim 10^2 - 10^4 r_s$ from BH, mass outflow rates $\sim 0.01 - 1 M_\odot$ yr$^{-1}$
- Mechanical power $\sim 10^{42} - 10^{44}$ erg ($>0.5 - 5\% L_{bol}$), important for AGN feedback
- Interpretation consistent with accretion disk winds
- **Confirmed** by independent Suzaku analysis (Gofford et al. 2013)
Fe K absorbers in radio-loud AGNs (XMM & Suzaku)

- Combining results with literature, UFOs in 7/26 (~30%) sources
- But only ~56% spectra have enough S/N, frequency of UFOs is f=(50±20)%
- Similar to RQ AGNs: jet related RQ/RL dichotomy does not apply to disk winds?

(Tombesi et al. 2014)
Large-scale molecular outflow with Herschel

- IRAS F11119+3257, ULIRG z=0.189, QSO luminosity $10^{46}$ erg/s
- Herschel spectrum of the OH 119µm P-Cygni line profile
- Molecular outflow 1000 km/s, 800 $M_\odot$ yr$^{-1}$ at >300 pc
- Depletion of the reservoir of “star-making” gas

(Credit ESA/ATG medialab)
Accretion disk wind detected with Suzaku

- Long 250ks Suzaku observation in May 2013
- Detection (6.5sigma) broad absorption line at rest-frame $E=9.82\text{keV}$
- XSTAR fit: $v=0.255c$, $\log x_i=4.11$, $N_h=6\times10^{24}$, covering fraction $>0.85$
- See also recent paper on Mrk 231 (Feruglio et al. 2015)
BREAKING THE LIMITS

SUPER-EDDINGTON ACCRETION ON COMPACT OBJECTS.

Arbatax (OG), Italy, 19–23 September 2016