

Weakly Accreting AGN and their Receding Tori: an infrared view of unification

Plotkin et al. 2012, ApJ Letters, 745, 27

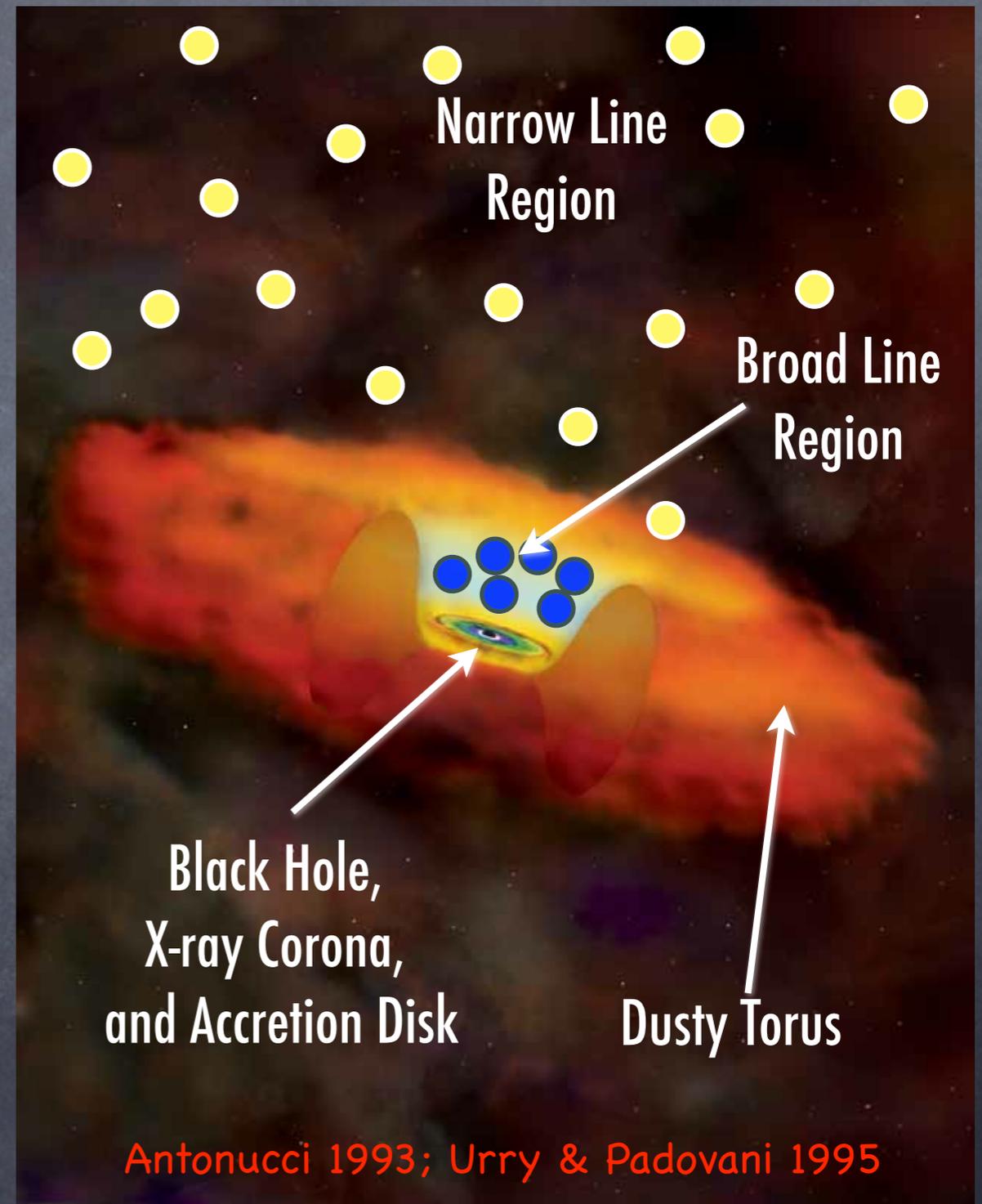


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AGN Unification Relies on Orientation Angle

- The Dusty Torus ($\approx pc$) is a key component in the standard paradigm
 1. Dust component reprocesses radiation into the infrared
 2. Torus can obscure our view of the inner accretion flow and of the broad emission line region



AGN Unification 2.0: What's Important Beyond Orientation?

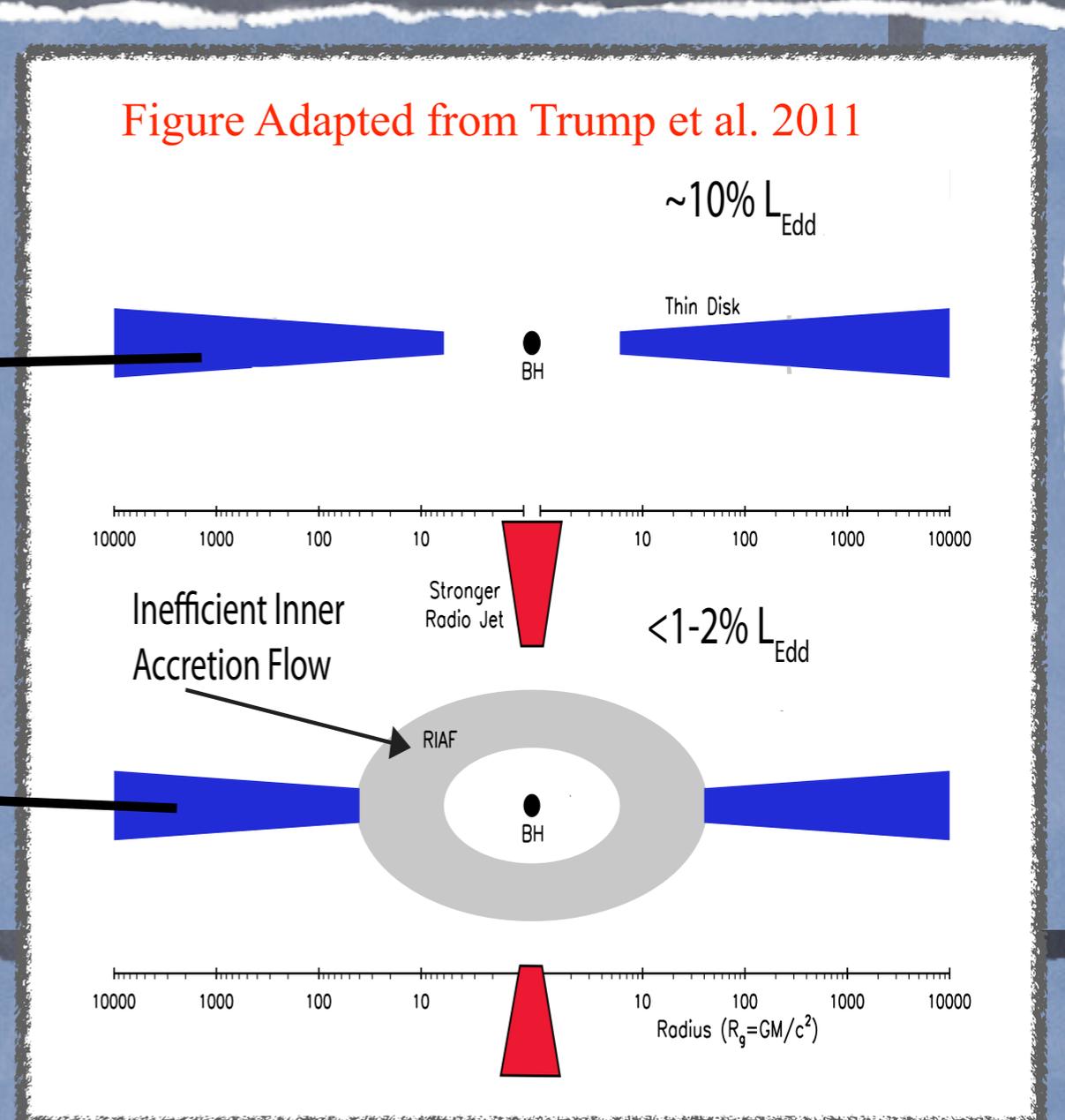
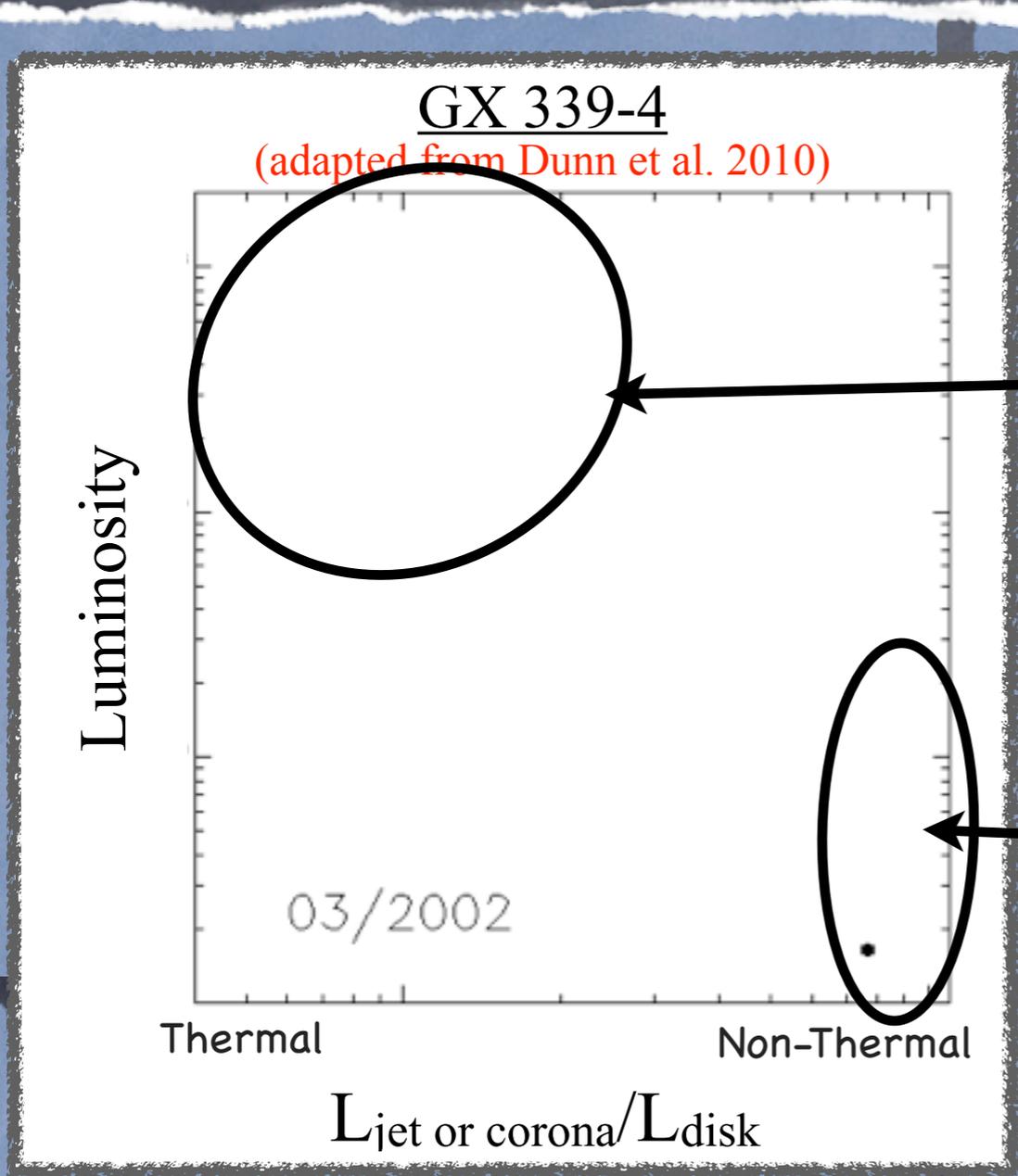
1. How important are environment, accretion rate, temperature of gas reservoir, etc?

- Note, work on non-geometric factors predates the orientation-based paradigm (e.g., Boroson & Green 1992, etc.), and are even discussed by Urry & Padovani (1995).

2. Do all AGN contain the same basic components?

- Answer is extremely important if we want to understand galaxy/black hole (co)-evolution

Microquasars change during outbursts, yet their orientations are constant



Black Hole X-ray Binary
($\sim 10 M_{\text{Sun}}$)

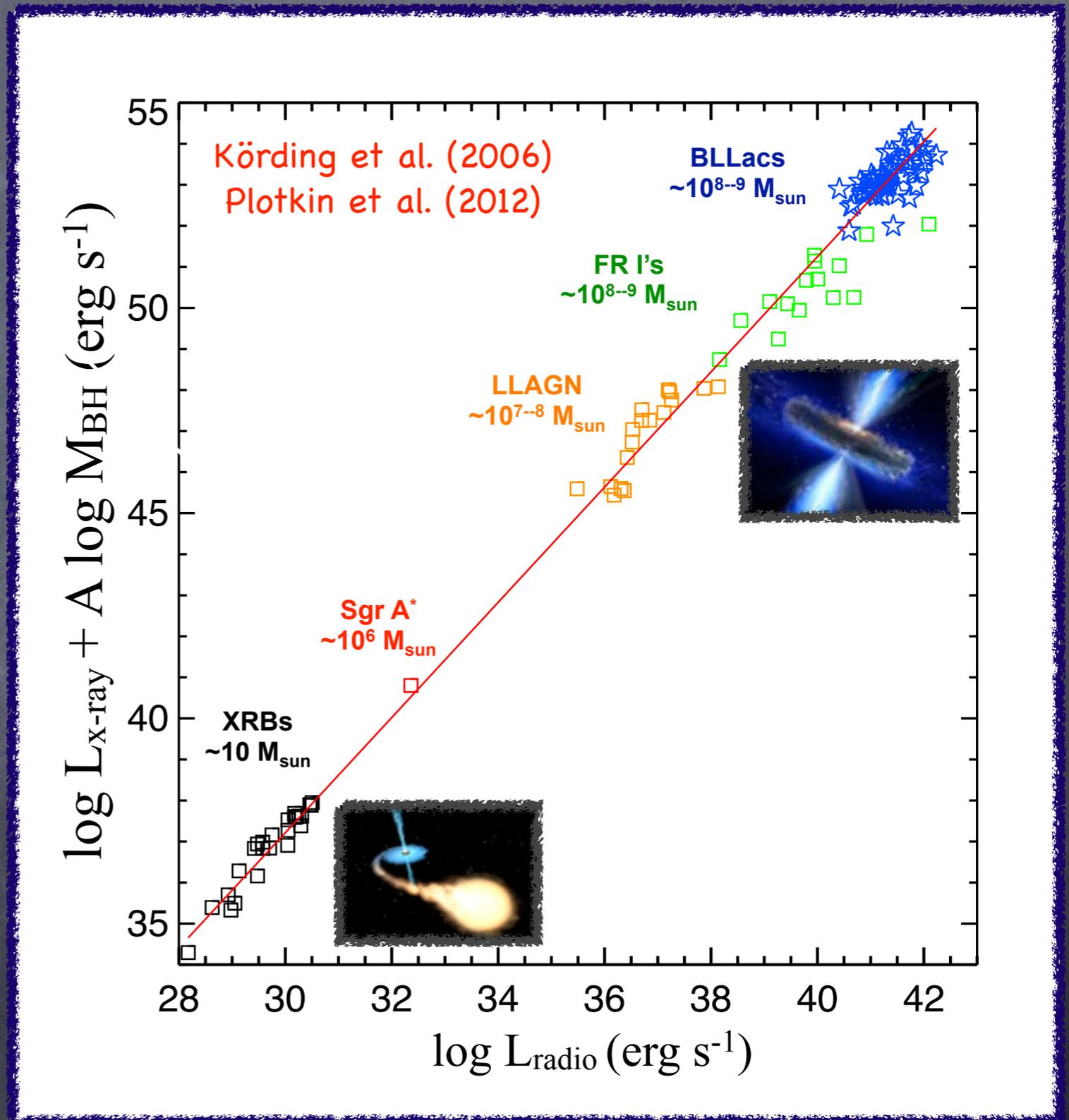
Nature of Inner Accretion
Flow Likely Evolves

Fundamental Plane of Black Hole Activity

(Merloni et al. 2003, Falcke et al. 2004)

For sub-Eddington BHs:
the conversion of the accretion flow into radiative output is universal across the black hole mass scale

Also a "variability" plane
(e.g., McHardy et al. 2006,
Körding et al. 2006)



AGN Unification 2.0: What's Important Beyond Orientation?

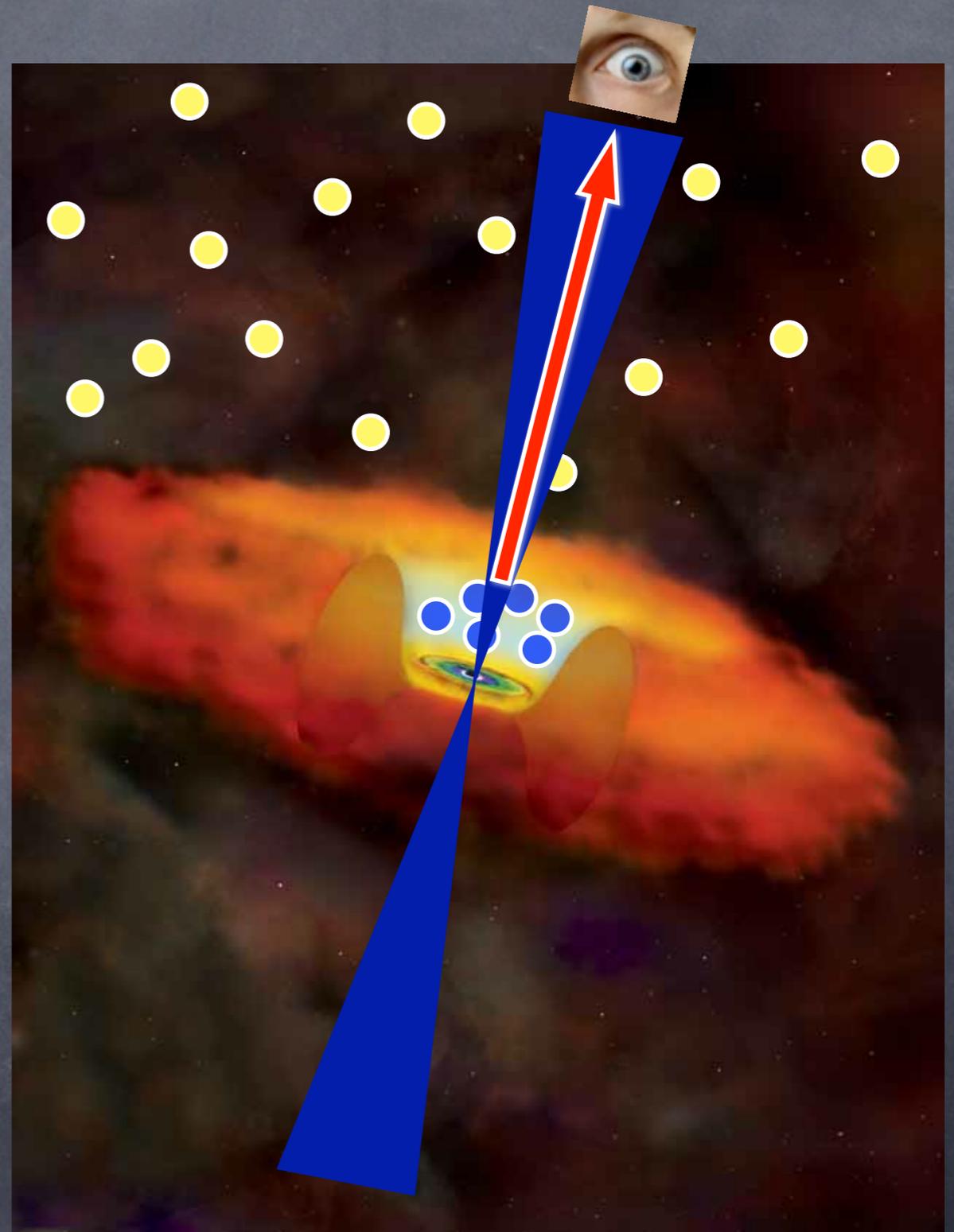
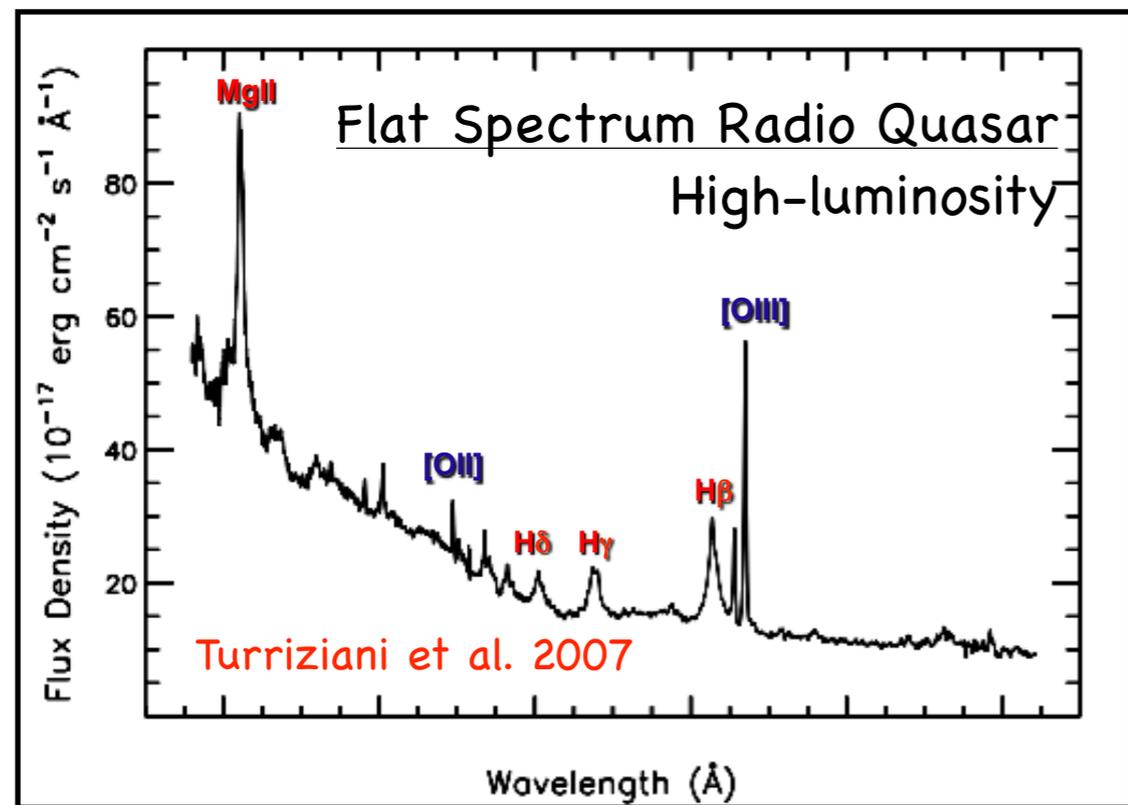
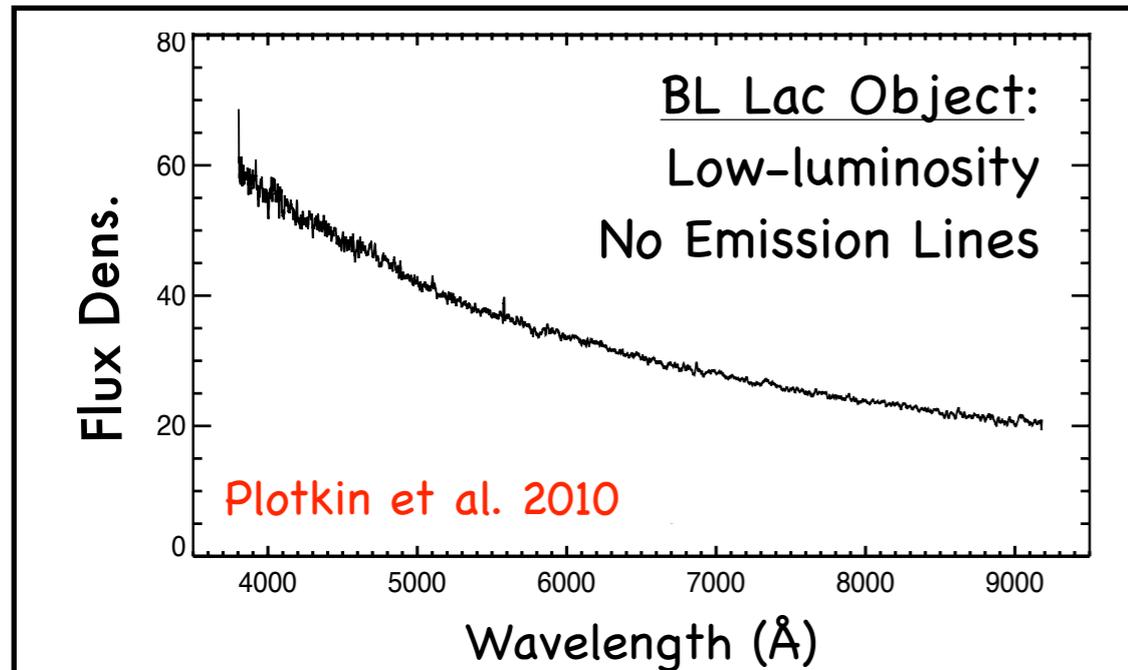
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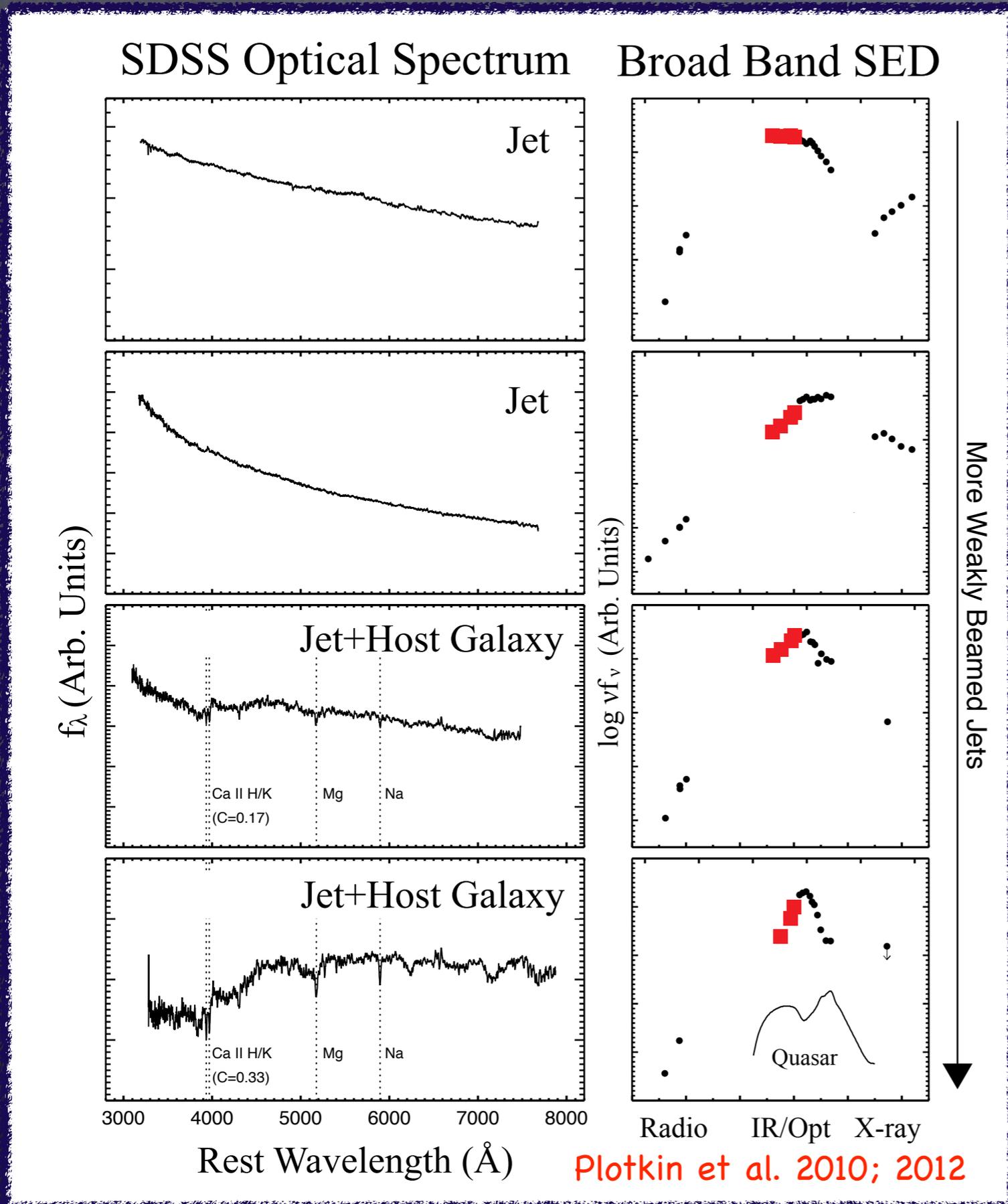
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Blazars Afford a Unique View of AGN Unification



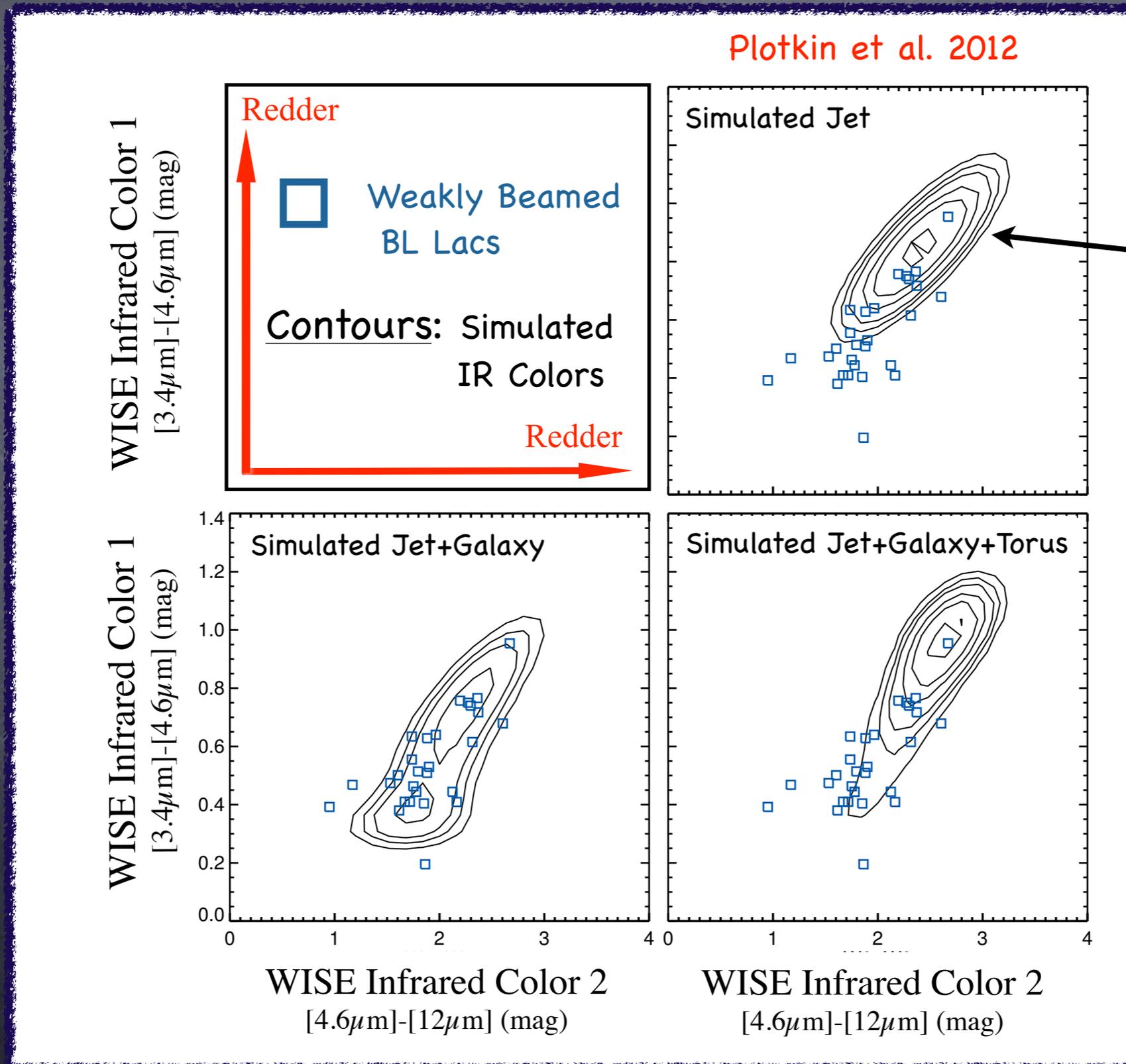
Urry & Padovani 1995

BL Lac Objects



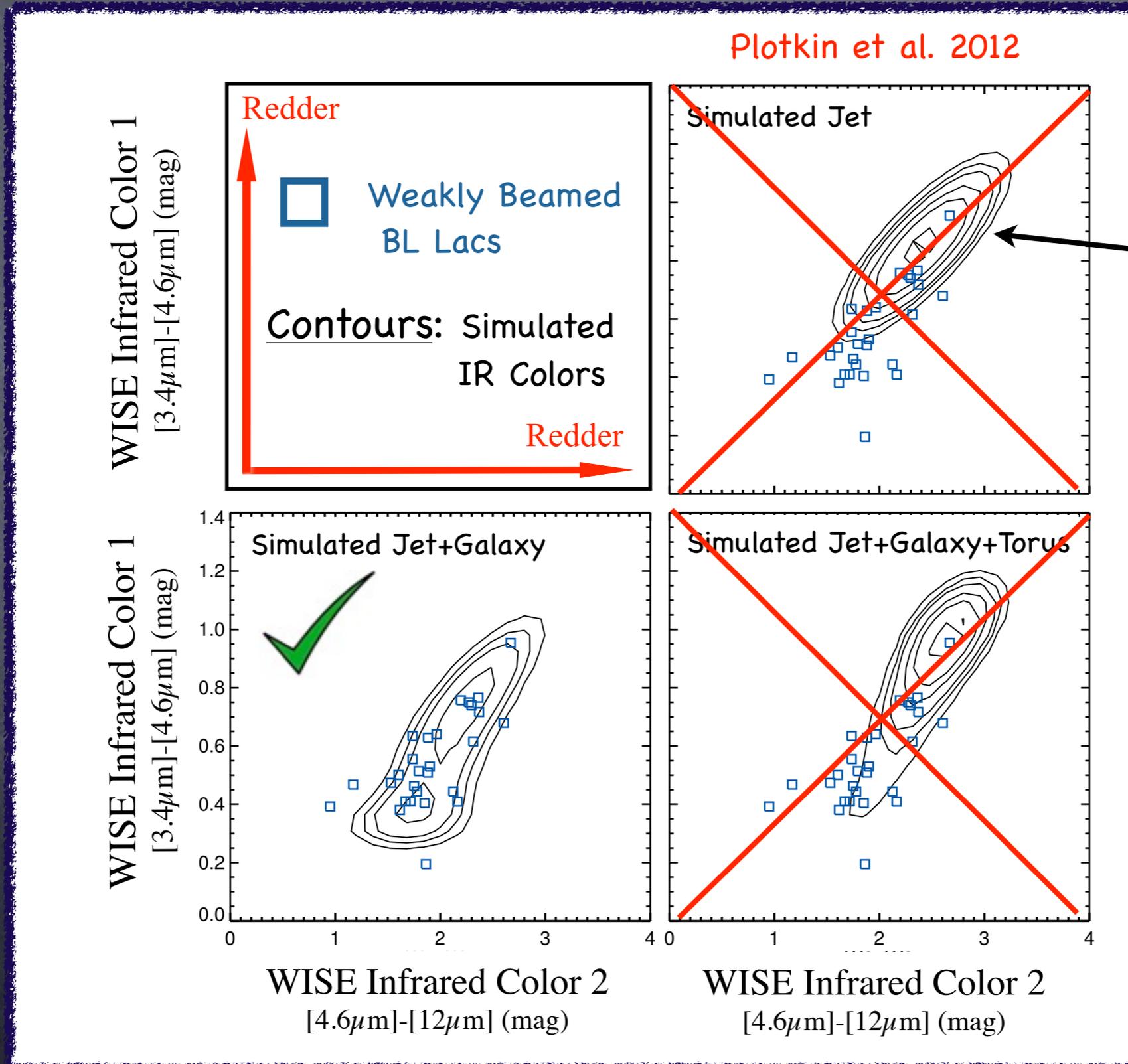
Mid-Infrared Colors with WISE:

Most BL Lacs are Missing Dusty Torus Emission



Mid-Infrared Colors with WISE:

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BL Lacs (and \therefore Low-luminosity Radio Galaxies) have Radiatively Inefficient Accretion Flows

(e.g., also see Jackson & Wall 1999; Nicastro 2000; Ghisellini & Celotti 2001; Böttcher & Dermer 2002; Wold et al. 2007; Ghisellini et al. 2009, Hardcastle et al. 2009; Trump et al. 2011; Antonucci et al. 2011)

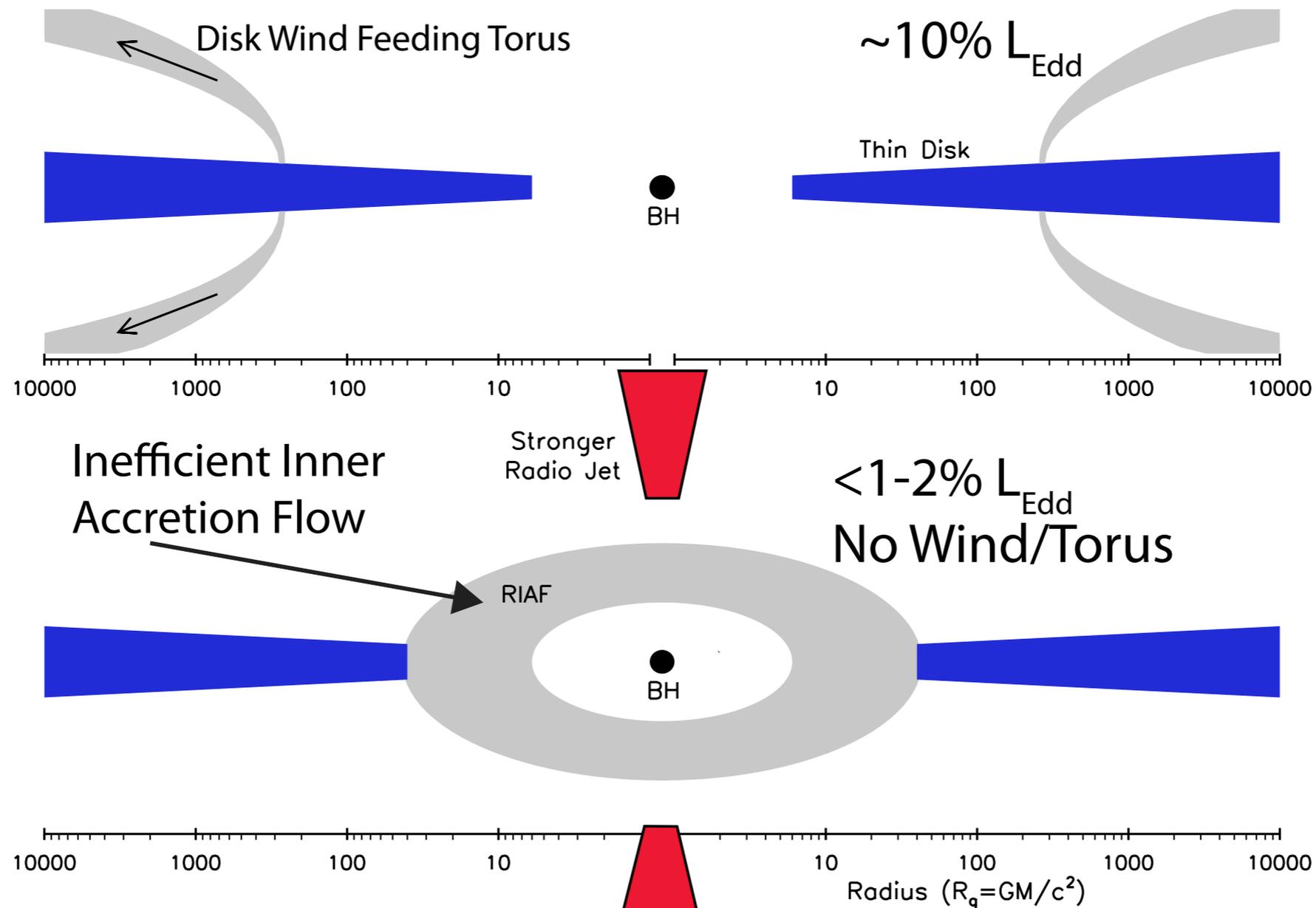
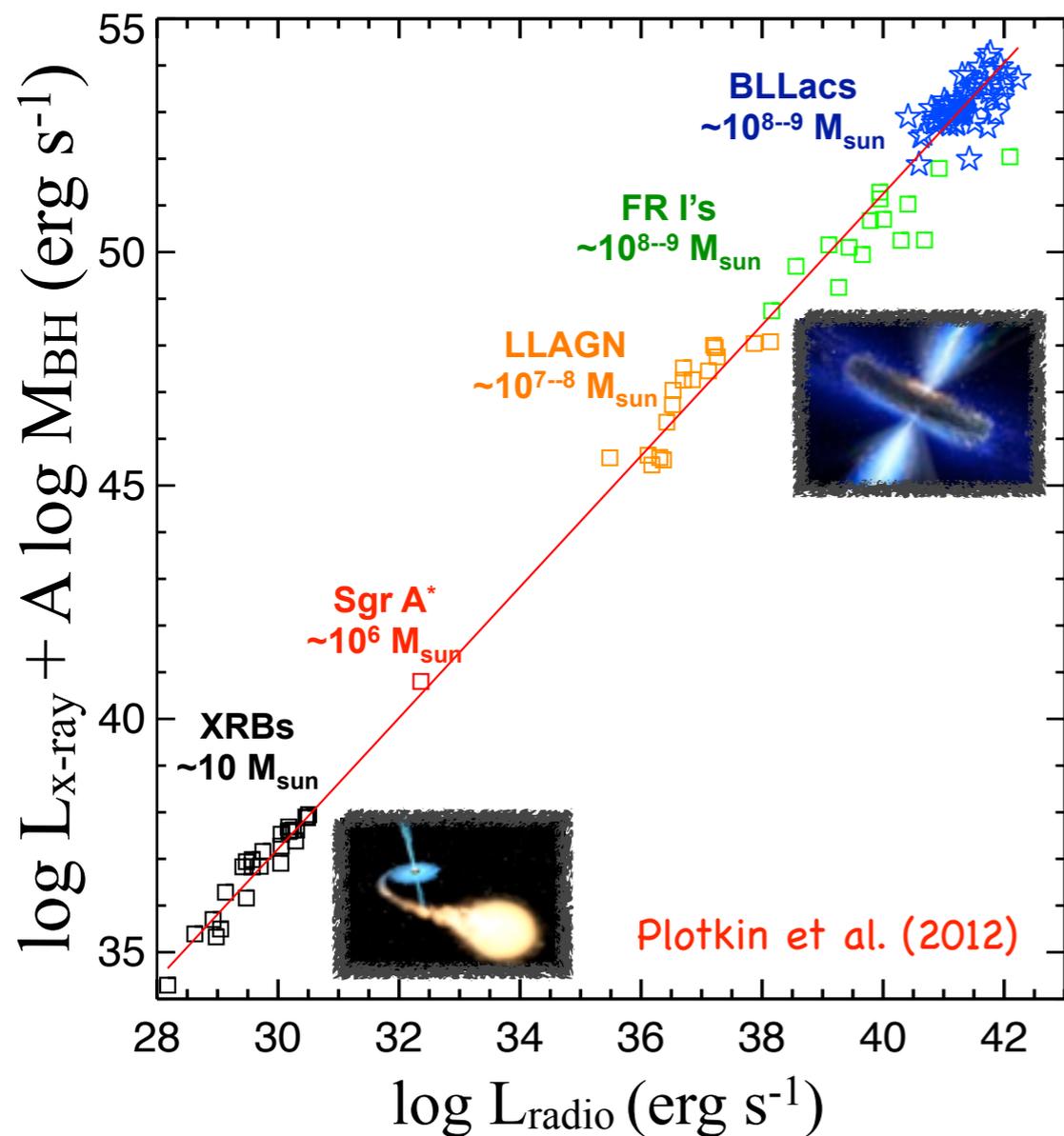
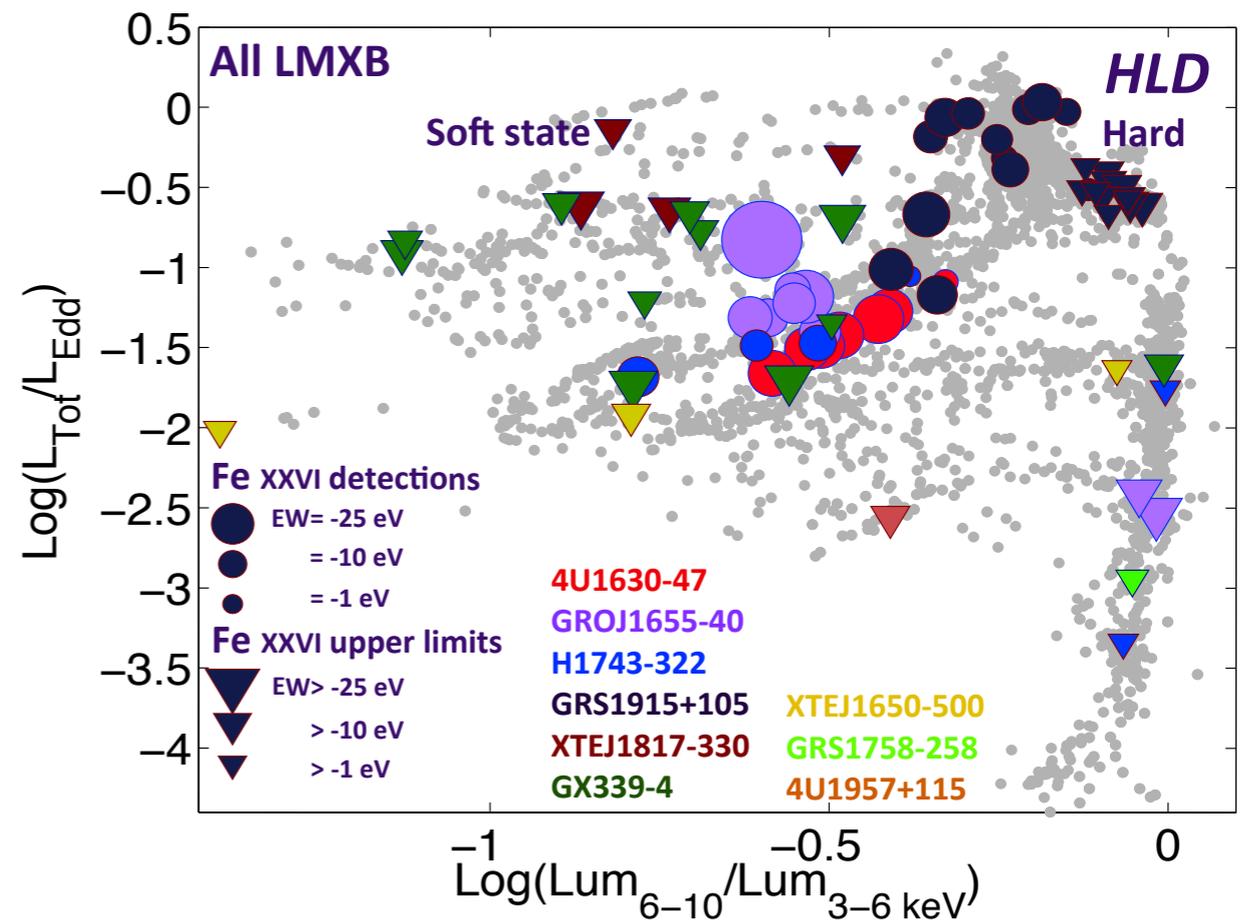


Figure Adapted from Trump et al. 2011

Lack of wind fed torus for "Hard State" AGN fits our global view of black hole accretion



GBH Winds Not Detected in Hard State



Ponti et al. (2012)

Summary

1. Low-luminosity radio galaxies have weaker dusty tori than expected. Their tori are fundamentally different than for luminous quasars
 - BL Lac tori are not simply diluted by the jet
 - BL Lac emission lines are intrinsically weak!
2. AGN unification depends on efficiency of accretion flow
 - Intrinsic Differences are important for FR I/BL Lac vs. FR II/FSRQ divide, including their radio (and gamma-ray) jet properties
3. Stellar Mass BHs are informing AGN Unification Models!