

# Reanalyzing the Relationship Between X-ray PSD Breaks and Black Hole Mass

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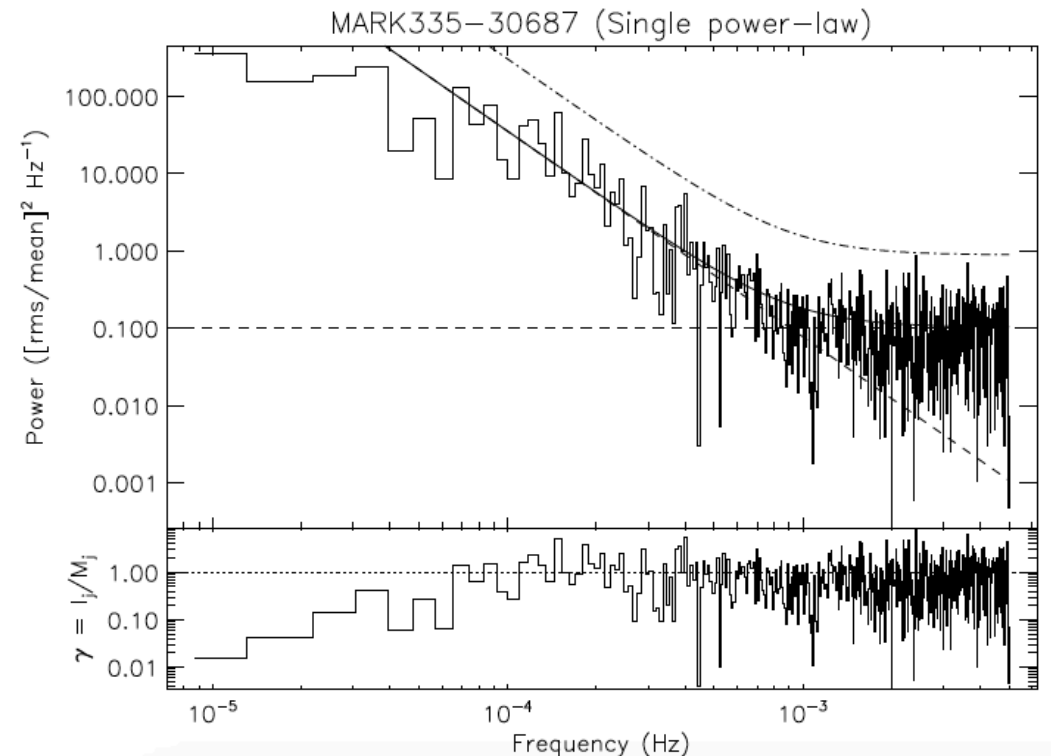
**AGN Storm Collaboration Meeting**

Atlanta, Georgia

18 August 2017

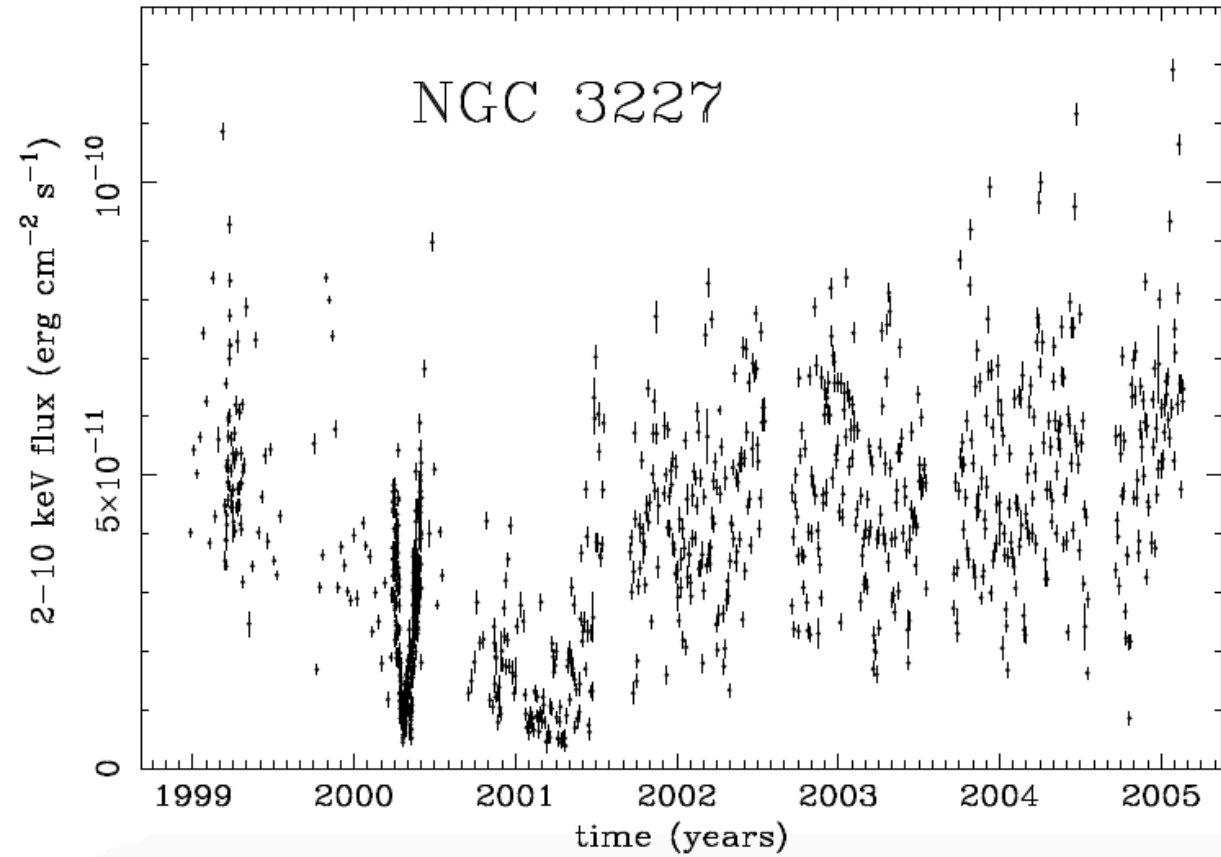
# Power Spectral Density Functions

- Radio-quiet AGN X-ray variability equivalent to red noise (Uttley&McHardy, 2005)
- Short scale (higher frequency)
  - Hours  $\rightarrow$  Days
  - Slope  $\sim -2$
- Long Scale (lower frequency)
  - Weeks  $\rightarrow$  Years
  - Slope  $\sim -1$

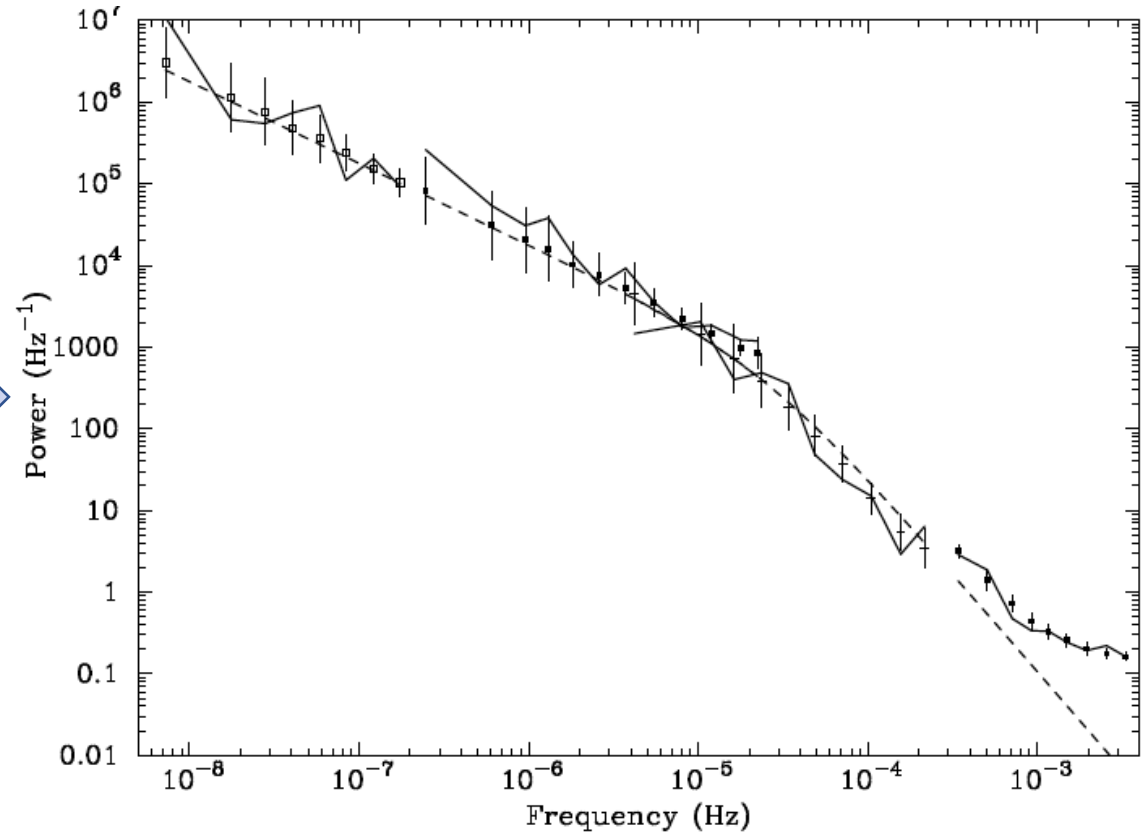


(González-Martín & Vaughan, 2012)

# Making PSDs



Fourier Transform



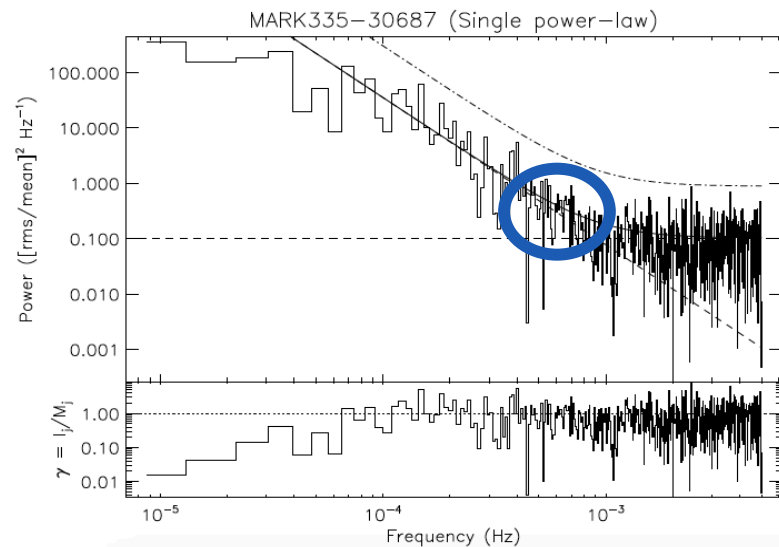
# AGN v. BH-XRB

- Is SMBH behavior scaled up stellar mass BH behavior?
  - Narrow line Seyfert I
    - Similar to BH-XRB in high/soft state
  - Broad line Seyfert
    - Similar to BH-XRB in low/hard state
- Broad band PSD better test
  - Accretion
  - PSD shape is different between BH-XRB states

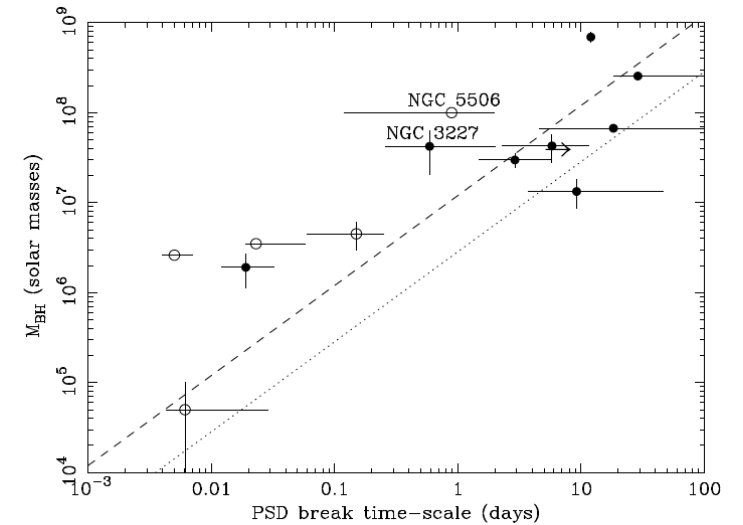
# Fitting the Breaks

- Slope changes at some bend frequency,  $\nu_b$  (González-Martín & Vaughan, 2012)
- $\nu_b$  scales inversely with mass of BH
- Fitting the PSD

- Power law
- Broken power law
- Bending power law
- ???



(González-Martín & Vaughan, 2012)



(Uttley & McHardy, 2005)

# Going Forward

- Has anything changed?
  - New Masses
  - New Sources
- What is the best way to characterize  $v_b$ ?
- Be consistent across the board
  - Systematics?
  - ???