

Astrostatistics

Tuesday, 30 January 2017

Lectures will now be held in Meeting Room 5

Office Hours
Friday @ 1pm
Statistical Laboratory
CMS Pavilion D, Office 1.07

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<https://github.com/CambridgeAstroStat/PartIII-Astrostatistics>

- Fitting Statistical Models to Astronomical Data
 - Maximum Likelihood vs. χ^2
 - Generative / Latent Variable Modeling / Bayes
 - Ivezić Ch 4 “Classical Statistical Inference” & Ch 5 “Bayesian Statistical Inference”
 - F&B Ch 3 “Statistical Inference”
 - Hogg, Bovy & Lang. “Data analysis recipes: Fitting a model to data”.
<https://arxiv.org/abs/1008.4686>

Fitting Models to Astro Data

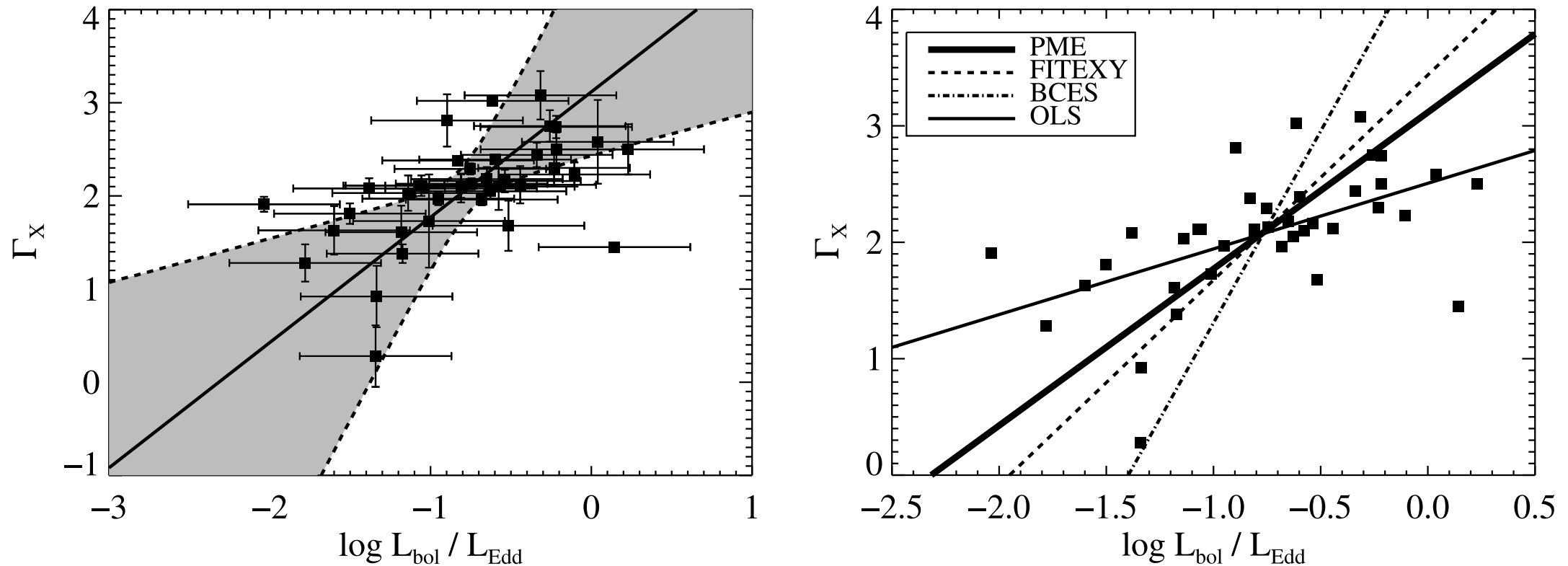


FIG. 10.—X-ray photon index Γ_X as a function of $\log L_{\text{bol}}/L_{\text{Edd}}$ for 39 $z \lesssim 0.8$ radio-quiet quasars. In both plots, the thick solid line shows the posterior median estimate (PME) of the regression line. In the left panel, the shaded region denotes the 95% (2σ) pointwise confidence intervals on the regression line. In the right panel, the thin solid line shows the OLS estimate, the dashed line shows the FITEXY estimate, and the dot-dashed line shows the BCES($Y|X$) estimate; the error bars have been omitted for clarity. A significant positive trend is implied by the data.

Modelling heteroskedastic, correlated measurement errors in both y and x, intrinsic scatter, nondetections, selection effects

B. Kelly et al. 2007, “Some Aspects of Measurement Error in Linear Regression of Astronomical Data.” *ApJ*, 665, 1489