Extreme Spectral Variability in TDSS Quasars

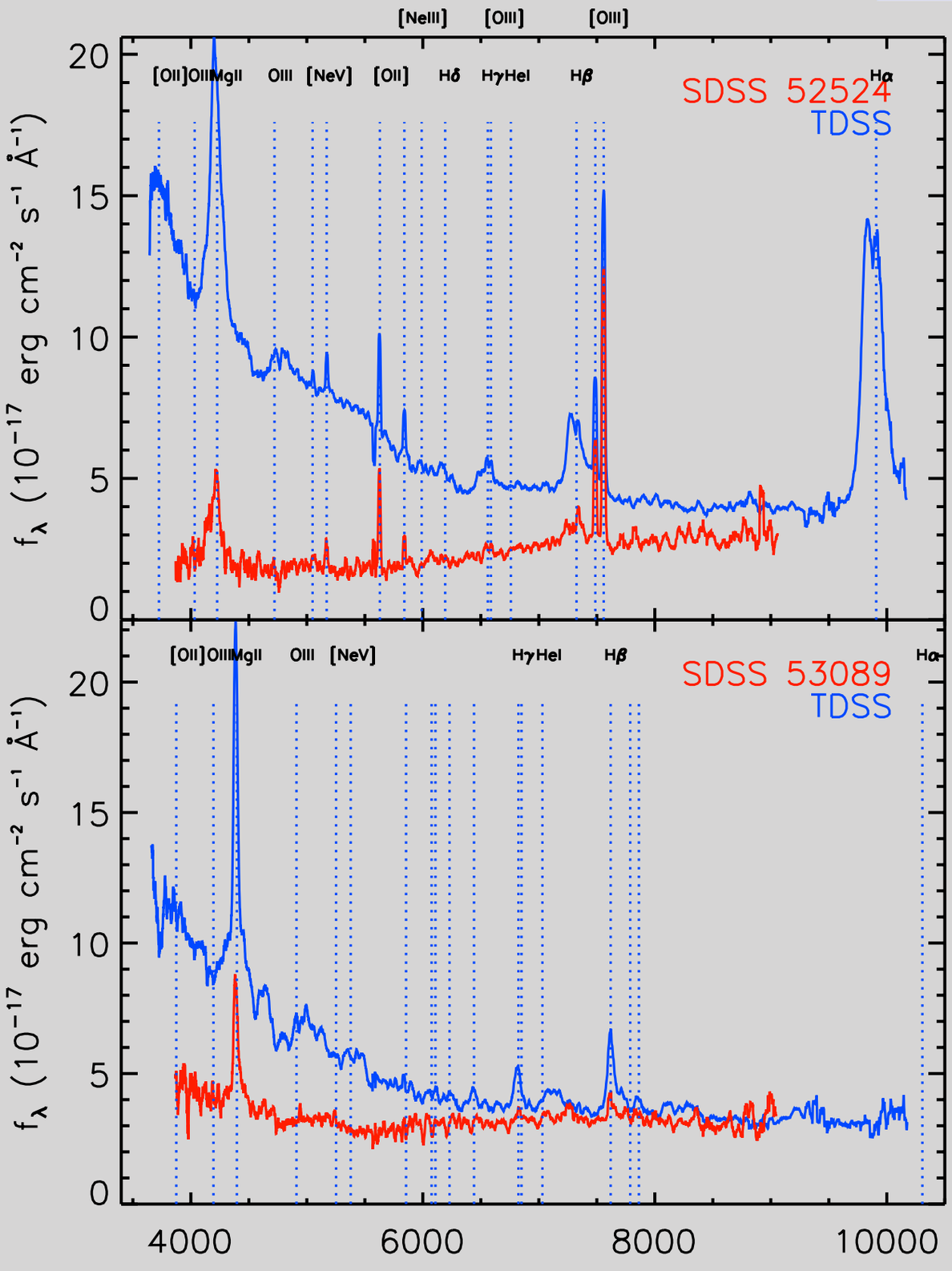
Chelsea MacLeod (CfA), Paul Green (CfA), Scott Anderson (UW), Michael Eracleous (PSU),
Jessie Runnoe (UMich), John Ruan (McGill), and the TDSS team

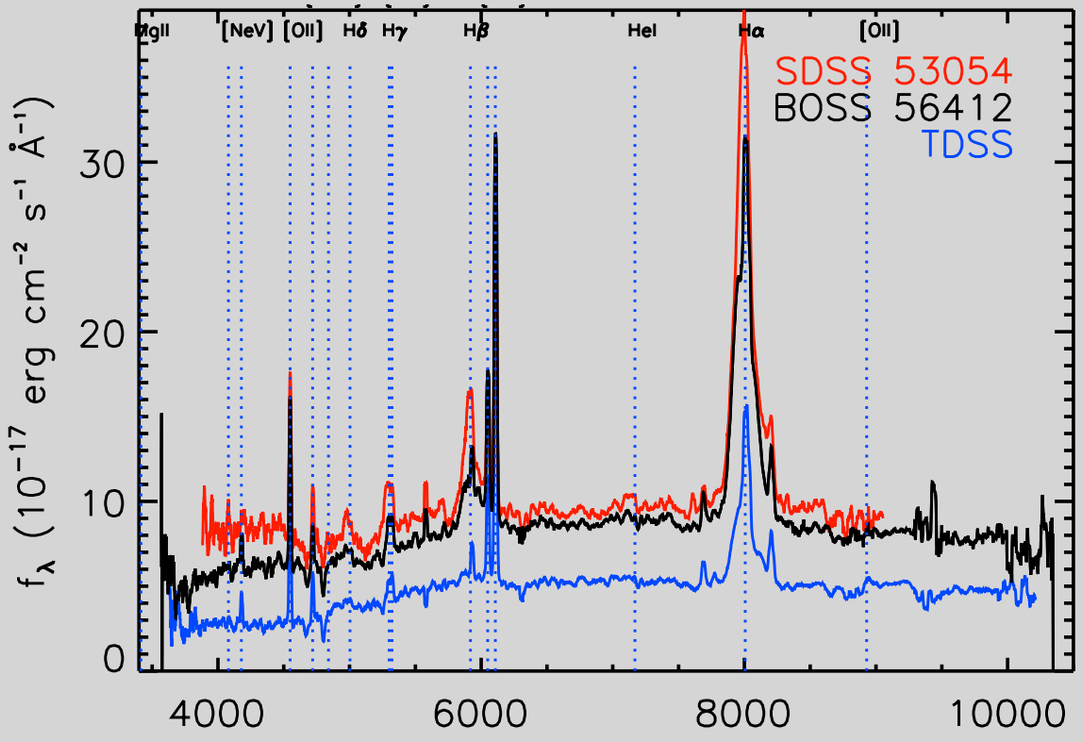
Relevant Programs in the Time Domain Spectroscopic Survey (TDSS):

- RQS=repeat quasar spectroscopy
  - About 10,000 fibers (10/deg^2)
  - All i<19.1 QSOs (+most-variable to i<20.5)
  - Prioritize those getting >2 spectra
- FES=few-epoch spectroscopy of variables of unusual interest; ~$10^{3\text{-}4}$ fibers

(for details, see MacLeod et al 2018)

Shown are examples of changing-look quasars
(out of 80 candidates culled from visual inspection)





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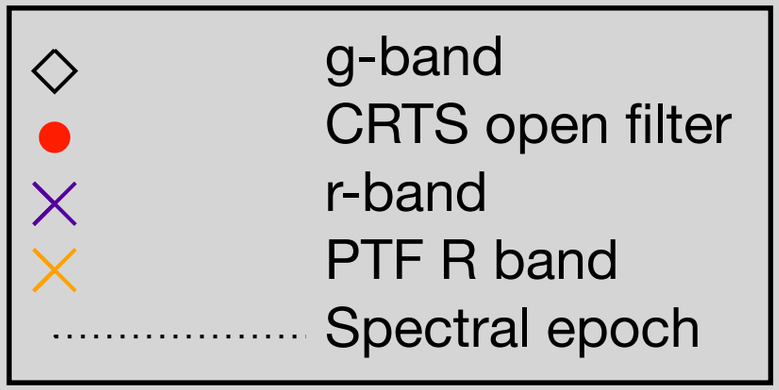
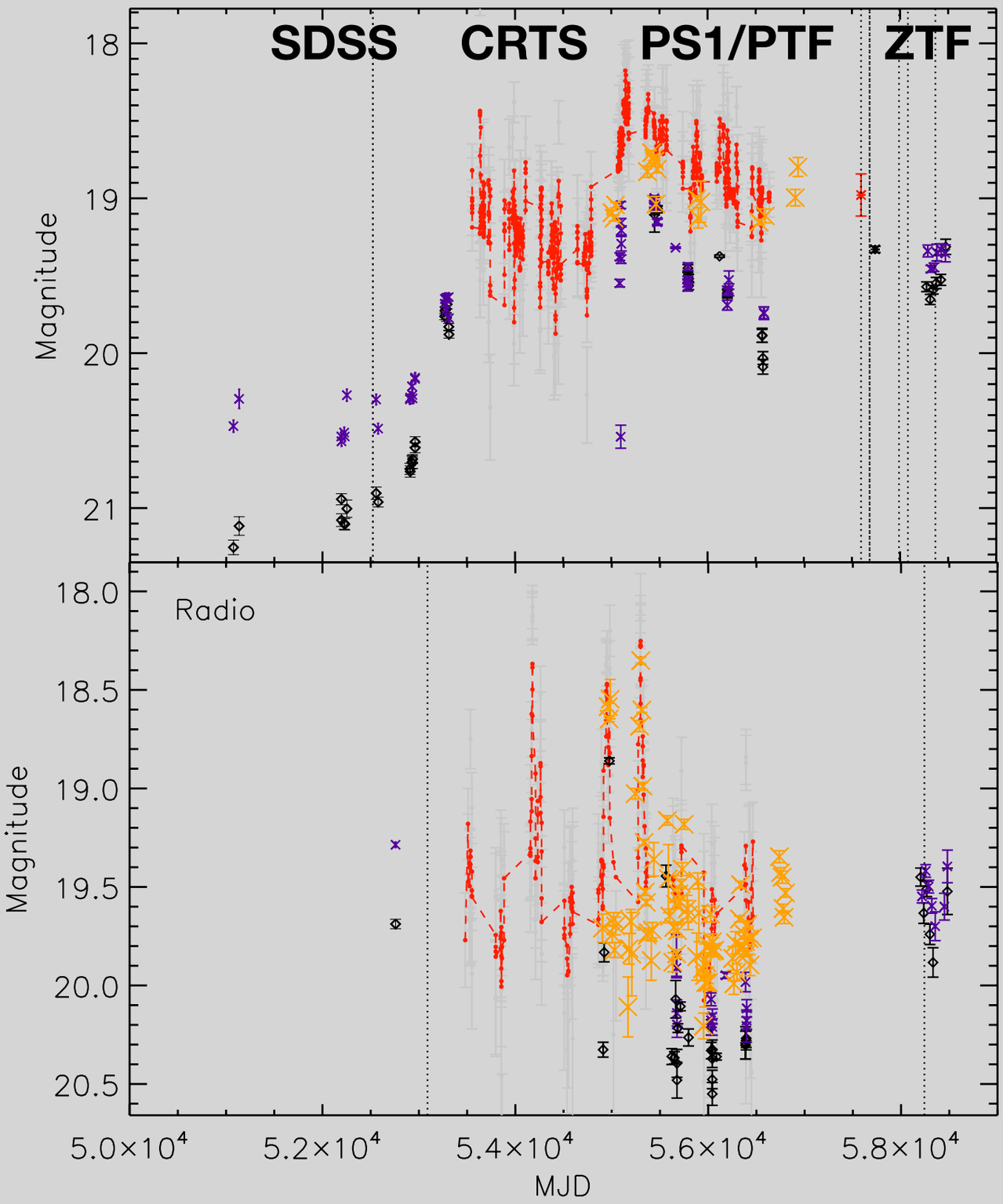
Corresponding Light Curves for examples on previous slide:





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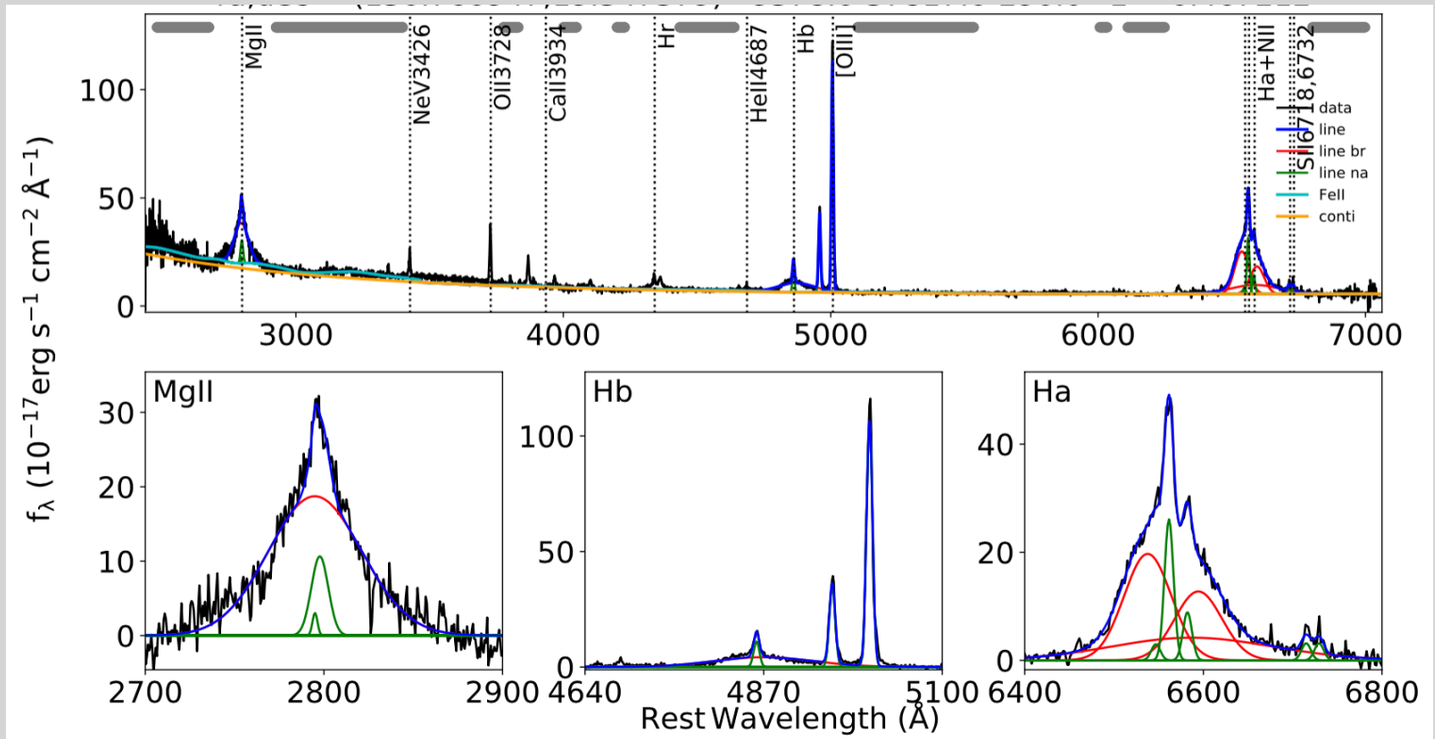
Spectral Decomposition (by Serena Moseley, SAO REU)

- **PyQSOfit** (Guo et al 2018):
  - Empirically good fits to all spectra
  - Unable to decompose host galaxy in 66% of z<1 cases
- **QSfit** (Calderone+ 2017):
  - Bad fit in ~10% of cases
  - Use to recover host galaxy

Future:

- Automate CLQ selection in RQS sample
- Applicable to SDSS-V Black Hole Mapper (Kollmeier et al 2017)
- Extract information from X-rays, radio, etc.

Example PyQSOFit Decomposition:



Same spectrum poorly fit by QSfit: