Temperature Profiles of QSO Accretion Disks

A Project Proposal

Christian Wolf

Australian National University

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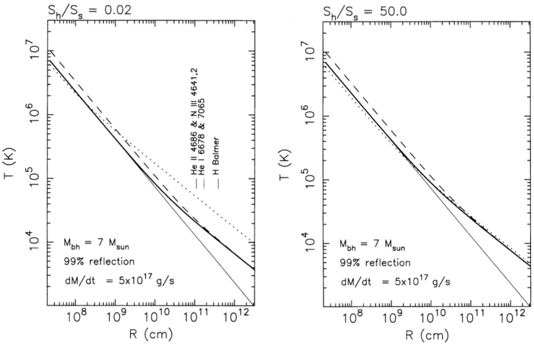
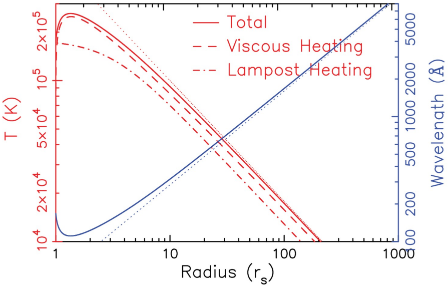
Temperature Profiles – XRBs vs AGN



XRB models (Wu+2001)



AGN Sketch (Starkey+2016, Cackett+2021)

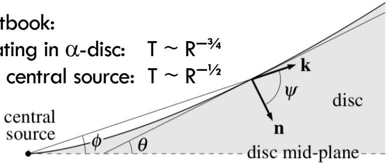
Viscous heating in α-disc: $T \sim R^{-3/4}$

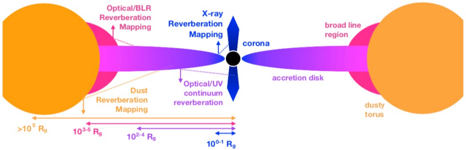
Heating by lamp-post: $T \sim R^{-3/4}$

Frank+ textbook:

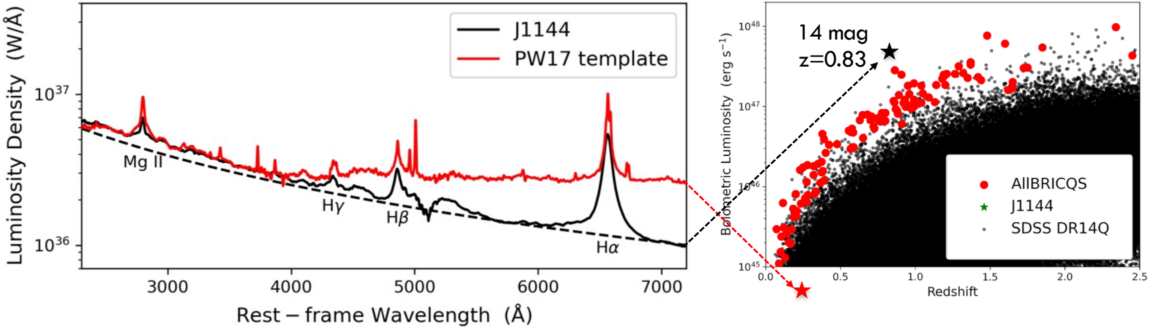
Viscous heating in α-disc: $T \sim R^{-3/4}$

Heating by central source: $T \sim R^{-1/2}$





UV-Optical SEDs – High-L AGN vs Low-L AGN



J1144: Highest-L QSO at z<1.5 (Onken+2022)

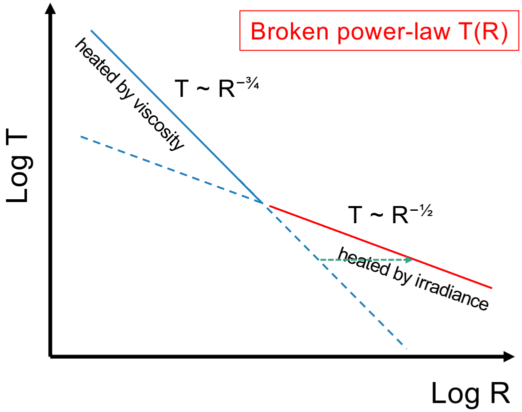
PW17: template of >1000× lower-L AGN (Pol & Wadadekar 2017)

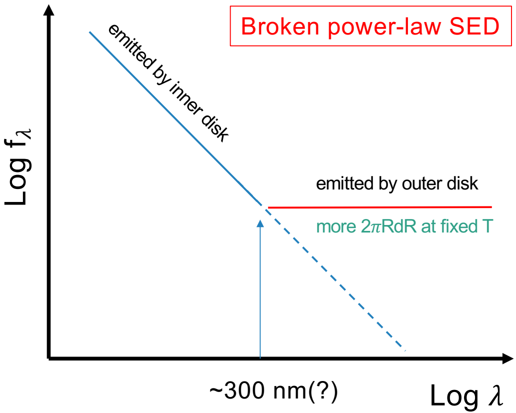
$f_{\boldsymbol{\nu},\mathrm{UV}} \sim \boldsymbol{\nu}^{-1/2} \sim f_{\boldsymbol{\nu},\mathrm{opt}}$

$f_{\boldsymbol{\nu},\mathrm{UV}} \sim \boldsymbol{\nu}^{-1/2}$ and $f_{\boldsymbol{\nu},\mathrm{opt}} \sim \boldsymbol{\nu}^{-3/2}$

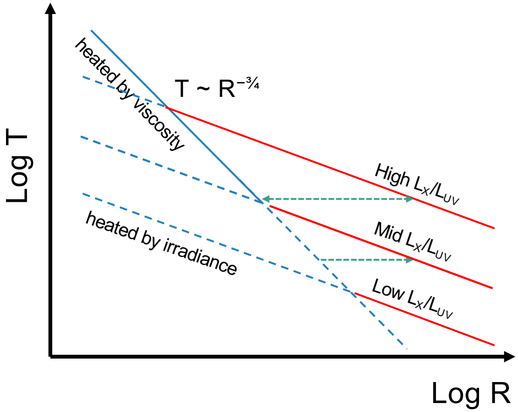
TWO HEATING SOURCES

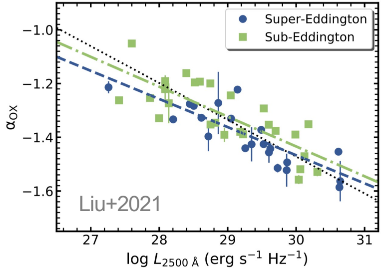
VISCOSITY AND IRRADIANCE

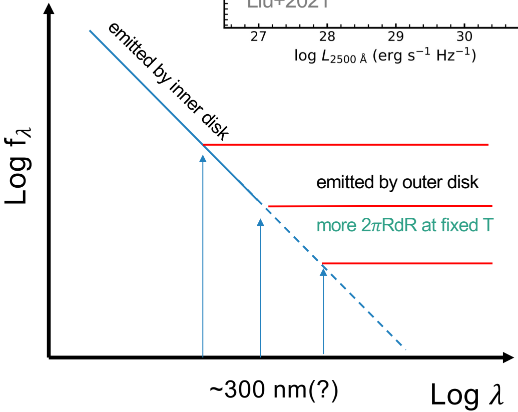




TWO HEATING SOURCES
VISCOSITY AND IRRADIANCE







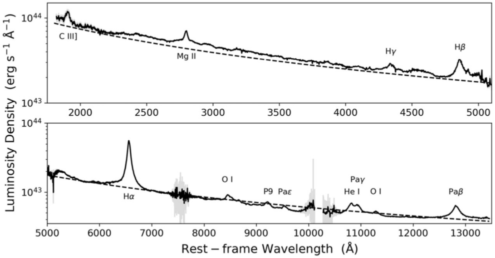
PROPOSED PROJECT

Optical-IR Spectroscopy

- 2024A at T-Spec@3.9m-SOAR
  - ✓ 40 highest-L QSOs at $z \simeq 0.55\ldots0.85$
- ESO (XShoo), Gemini (F2) archives
- 180+ low-L QSOs in archives
  - ✓ Landt+2008, NASA IRTF, z ~ 0.1
  - ✓ Kenyon+2019, Gemini F2, z ~ 0.6
  - ✓ Ricci+2022, Magellan FIRE, z ~ 0.1
  - ✓ Trakhtenbrot+, VLT XShooter, 0<z<1
- Host subtraction via stellar abs lines
- Establish continuum breaks as $f(L_{UV})$

Use X-ray fluxes from eRASS5

- Degeneracy between host subtraction errors and true dependence on L_X/L_{UV}
- At fixed L_{UV}, find trends between L_X/L_{UV} and SED breaks



OptIR λ range @ z~0.8
(J1144, Onken+22)