The behavior of the broad Mg II emission line in **changing-look quasars**

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Motivation

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This depends heavily on signal-to-noise ratio. "Contrast" of the broad lines is extremely important.

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Runnoe et al. (2016)

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MacLeod et al. (2016)

Reasons to be interested in Mg II

Observations of Mg II enable spectral tests that cannot be done with the Balmer lines alone.

 Mg II varies differently than the Balmer lines in regular quasars on short timescales.

This is an opportunity to leverage long-timescale variability to learn fundamentally new things about the broad-line region.

• You may think of more...

Mg II and the broad-line region

 The region that emits Mg II has some overlap with Hβ, but a larger outer radius.

e.g., Goad et al. (1999a)

• Mg II is about twice as strong as H β .

Collin-Souffrin & Dumont (1989); Rees, Netzer, & Ferland (1989)

The Mg II line is not very responsive to changes in the continuum.

Sun et al. (2015); Cackett et al. (2015); Goad, O'Brien, & Gondhalekar (1993); O'Brien, Goad, & Gondhalekar (1995).



• Can we use Mg II to rule out obscuration?

Is the persistent broad Mg II emission actually that unusual?

Object the Mg II behavior indicate a fundamentally different process at work in changing-look quasars?

The Mg II changing-look quasars



Isolating the AGN spectrum



The changes are not caused by extinction



The "radius" of the Mg II emitting region



The Mg II responds on longer timescales



Interpretation

- Obtailed study of spectra with Mg II can rule out extinction, as expected from zeroth order analysis.
- Based on their Mg II emission, these changing-look quasars do not seem to be a unique phenomenon (consistent with Rumbaugh et al. 2017).
- But...studying variability on long timescales opens up an entirely new realm of behavior!