**Complex Circumnuclear Structures in the Radio-Loud AGN Mkn 6**

**Summary**

Mkn 6 is a radio-loud Seyfert with sustained, recurrent radio activity. Its jet may have recently changed direction, in which case the accretion structure may no longer be fully aligned, and one might expect a complex circumnuclear environment. Mkn 6’s X-ray spectrum does in fact consistently display coverages of thin and thick time-varying X-ray absorption (e.g., B. Mingo et al. 2011, ApJ, 731, 21).

Here, we present preliminary results from two new broadband X-ray observations, XMM-Newton and NuSTAR, obtained in 2015 November and 2015 April, respectively. We apply our best-fit model to archival data:

- **XMM-Newton** (2001 April, 2005 October, and 2015 November) and **NuSTAR** (2015 April).

We successfully applied a self-consistent absorption model to a complex structure of radio jets, unresolved Fe Kα features, partial-covering clumps, and Compton reflection. The HXPL’s current 2–50 keV luminosity is consistent with illuminating this component.

**Observations & Spectral Fitting Results**

Mkn 6 observed Mkn 6 simultaneously with Swift-XRT in November 2015, each yielding 0.5–50 keV spectra.

We applied our best-fit model to archival XMM-Newton and Chandra-ACIS observations spanning 2001–2009. To anchor the HXPL slope, and to include Compton-reflected emission from all components, we performed joint fits with 50–180 keV XNustar data, using whichever XMM observation is closest in 10–50 keV flux, while allowing for the flux offsets. Results are summarized in Table 1.

**Interpretation**

- **Component B** corresponds to 8–14 clouds along the line of sight; Chandra’s 0.5–50 keV flux is offset by a factor of 1.75 (sum of hard power-laws illuminating components A & B). Best-fit covering fractions for component B are 77% ± 3% and 62% ± 8%, respectively.
- **Component C** corresponds to 4 (1) clouds along the line of sight; Chandra’s 0.5–50 keV flux is offset by a factor of 1.75 (sum of hard power-laws illuminating components A & B). Best-fit covering fractions for component C are 77% ± 3% and 62% ± 8%, respectively.

**Main Conclusions**

- We successfully applied a self-consistent absorption + reflection model to two newly-obtained joint XMM/XNustar and Chandra/XNustar observations in 2015 plus archival CCD-quality data 2001–2009. Our preferred model features full-covering Compton-thin absorption ($N_H = 1 - 8 \times 10^{22} \, cm^{-2}$), partial-covering Compton-thick gas ($N_H = 0.6 - 6 \times 10^{23} \, cm^{-2}$), and Compton-thick reflection ($N_H = 4 - 10^{24} \, cm^{-2}$) along the line of sight.
- We bound the jet orientation to be 77% ± 3% and 62% ± 8%.
- **Component C** is the only radio-loud AGN besides NCG 1365 and PGC 46729 that may not be fully stabilized, and one might expect a complex and messy circumnuclear environment.

**Conclusions**

- We successfully applied a self-consistent absorption + reflection model to two newly-obtained joint XMM/XNustar and Chandra/XNustar observations in 2015 plus archival CCD-quality data 2001–2009. Our preferred model features full-covering Compton-thin absorption ($N_H = 1 - 8 \times 10^{22} \, cm^{-2}$), partial-covering Compton-thick gas ($N_H = 0.6 - 6 \times 10^{23} \, cm^{-2}$), and Compton-thick reflection ($N_H = 4 - 10^{24} \, cm^{-2}$) along the line of sight.
- We bound the jet orientation to be 77% ± 3% and 62% ± 8%.