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ANEPD-CXO245: A COMPTON THICK AGN WITH DOUBLE-PEAKED NARROW LINES

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ANEPD-CXO245: A COMPTON THICK AGN WITH DOUBLE-PEAKED NARROW LINES.

In our multi-wavelength survey of the AKARI North Ecliptic Pole Deep Field, including X-ray observations obtained with Chandra (Krumpe et al. 2015), we have found a highly absorbed AGN (ANEPD-CXO245, hereafter CXO245; z = 0.449) that shows double-peaked narrow emission lines. The X-ray spectrum of CXO245 from our Chandra observations shows a prominent redshifted Fe Kα emission line at 6.4 keV with an equivalent width EW ≥ 2 keV (both in rest-frame). Our X-ray spectral analysis using the borus02 (Balokovic et al. 2018) AGN torus model shows that the torus/line-of sight column density of log(N_H) = 24.3 - 25.4 (90% confidence) and thus it can be classified as Compton-thick.

In order to distinguish among possible explanations for this behavior (a dual AGN, a rotating ring around the central black hole, or the view of the two sides of a bi-polar outflow), constraints on the opening angle of the obscuring dusty torus ($\theta_{\rm tor}$), as well as the line-of-sight (LOS) inclination ($\theta_{\rm inc}$) are important. We obtained the constraints on these torus parameters by (1) fitting our multi-wavelength SED (optical-IR) with the CIGALE SED analysis package (Noll et al. 2009), using an AGN torus emission component (Fritz et al. 2006) and (2) fitting the Chandra spectrum with borus02.

The results obtained with both the optical-IR and X-ray analyses consistently show that and $\theta_{\rm inc}$ is only slightly larger than $\theta_{\rm inc}$ (both from the torus polar axis), i.e., the LOS is just below the inner funnel of the torus. However, the constraints on $\theta_{\rm inc}$ and $\theta_{\rm tor}$ are highly degenerate, and deeper observations in the X-ray regime are required to obtain individual constraints. We also report the results of the analysis using the Clumpy Torus model (Nenkova 2008) in combination with the new XCLUMPY model (Tanimoto et al.).

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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