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Abstract

(from http://xmm.esac.esa.int/external/xmm_science/gallery/public/level3.php?id=1085) About 10-20% of quasars are of a special type called BAL (broad absorption line) quasars, which seems to indicate that a thick cocoon of gas surrounds the black hole at the centre of the quasar. Most researchers believe that gas flows away from a BAL quasar along the equatorial direction of the accretion disc. These quasars show little X-ray emission, indicating that there is enough gas to absorb most of the X-rays given out from the region near the black hole. But some BAL quasars appear to be spewing material out along their polar axes, at right angles to the accretion discs. As matter falls into the black hole, it collects in a swirling reservoir called the accretion disc, which heats up. Computer simulations suggest that powerful radiation and magnetic fields present in the region eject some of gas from the gravitational clutches of the black hole, throwing it back into space. XMM-Newton observed 4 polar outflow Broad Absorption Line (BAL) quasars in 2006 and 2007. Two of them emitted much more X-rays than the researchers anticipated, indicating that there is no veil of absorbing gas surrounding these particular quasars.

1 Section Heading

Weymann et al. (1991): http://adsabs.harvard.edu/abs/1991ApJ...373...23W

From Zhang et al. (2010; http://arxiv.org/abs/1004.0299): "About 15% of quasars show broad absorption lines (BALs) of high ionization ions such as N V , C IV , Si IV , Lyα , [O VI] , up to a velocity of $v \sim 0.1c$.

BALs are detected occasionally (another 15%) also in low ionization species such as Mg II , Al III .

1.1 Subsection heading