Some evidence against the blazar sequence

Paolo Giommi

Giommi, Menna & Padovani 1999,
MNRAS, 310, 465
The sedentary multifrequency survey - I.

(Radio flux limited/complete sample of ~ 150 extreme high energy peaked BL Lacs)

From the Abstract:

… A comparison with the expected radio logN-logS of all BL Lacs (based on a beaming model) shows that extreme HBLs make up roughly 2 per cent of the BL Lac population, independently of radio flux. This result, together with the flatness of the radio logN-logS at low fluxes, is in contrast with the predictions of a recent model that assumes an anticorrelation between peak frequency and bolometric luminosity." …

Giommi et al. 2001. In “Blazar astrophysics with BeppoSAX and other observatories”, p. 133.

Parameter Correlations and Cosmological properties of BL Lac Objects.

From the Abstract:

> .."We find that the fraction of HBL objects is the same at all observed fluxes and radio luminosities implying that there cannot be any strong correlation between the position of the synchrotron peak and radio luminosity”…

Padovani et al. 2003 ApJ 588, 128

What Types of Jets Does Nature Make? A New Population of Radio Quasars

From the Abstract:

> "Our large, deep, and homogeneous DXRBS sample [~500 objects] does not show anticorrelations between ν_{peak} and radio, broad-line region, or jet power, as expected in the so-called blazar sequence scenario. However, the fact that FSRQs do not reach X-ray-to-radio flux ratios and ν_{peak} values as extreme as BL Lac objects and the elusiveness of high-ν_{peak} high-power blazars suggest that there might be an intrinsic, physical limit to the synchrotron peak frequency that canbe reached by strong-lined, powerful blazars

Caccianiga & Marchã 2004 (MNRAS, 348, 937)

The CLASS blazar survey: testing the blazar sequence (325 Blazars with $f_{(5GHz)}$ > 30 mJy, rmag < 17.5)

From the Abstract:

"The data analysis shows that more than 30% of sources at low radio power ($P_{5GHz} < 10^{25}$ W Hz^{-1}) have an α_{RX} steeper than that expected in the framework of the `blazar sequence'..

… we show two examples for which the blazar nature is confirmed from VLBI data and for which the steep α_{RX} put these sources outside the Blazar sequence

... The results presented here show the importance of a correct and unbiased sampling of the low-power regime of the blazar population"

Giommi et al. 2005, A&A 434,385

The sedentary survey of extreme high energy peaked BL Lacs II. The catalog and spectral properties

From the Abstract:

"The optical spectrum of about one fourth of the sources is totally featureless hampering any redshift or luminosity determination. Because this implies that the non-thermal nuclear emission must be well above that of the host galaxy, these objects are likely to be the most powerful sources in the survey and therefore be examples of the yet unreported high radio-luminosity high-energy-peaked BL Lacs. The existence of such objects is at odds with the claimed inverse proportionality between radio power and synchrotron peak energy known as the "blazar sequence".

Nieppola Tornikoski and Valtaoja, A&A in press astro-ph/0509045

Spectral energy distributions of a large sample of BL Lacertae objects

From the Abstract:

> "This is the first time the SEDs of BL Lacs have been studied with a sample of over 300 objects. ... On the grounds of our results we conclude that the blazar sequence scenario is not valid.

Giommi et al. 2005, A&A in press astro-ph/0508034

Non-thermal cosmic backgrounds from Blazars: the contribution to the CMB, X-ray and gamma-ray backgrounds

From the section on “the Contribution to the CXB”:

> "… a strong increase of the fraction of HBL blazars at low radio luminosities (hence fluxes), as required by the blazar sequence
>
> …would result in a much larger blazar contribution to the CXB, inconsistent with the observations…