LARGE BENT JETS IN THE INNER REGION OF CSS

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1. Introduction

Recently we focussed our attention on a sample of Compact Steep-spectrum Sources (CSSs) selected because of the large bent radio jets seen in the inner region of emission. The largest distortions are often seen in sources dominated by jets, and there are suggestions that this might to some extent be due to projection effects. However, superluminal motion is rare in CSSs. The only case we know of so far is 3C147 (Alef at al. 1990) with a mildly superluminal speed of $\sim 1.3v/c$. Moreover, the core fractional luminosity in CSSs is $\sim 3\%$ and $\leq 0.4\%$ for quasars and radio galaxies respectively. Similar values are found for large size radio sources *i.e.* both boosting and orientations in the sky are similar for the two classes of objects. An alternative possibility is that these bent-jet sources might also be brightened by interactions with the ambient media. There are clear indications that intrinsic distortions due to interactions with a dense inhomogeneous gaseous environment play an important role. Observational support comes from the large RMs found in CSSs (Taylor et al. 1992; Mantovani et al. 1994; Junor et al. these proc.) and often associated with strong depolarization (Garrington & Akujor, t.p.). The CSSs also have very luminous Narrow Line Regions emission, with exceptional velocity structure (Gelderman, t.p.).

2. Our investigation

We are investigating a sample of sources showing large bent jets on the *mas* scale. Table 1 lists the selected sources. It is possible that these are extreme

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TABLE 1. Source parameters.

Source	ref	dist mas	dist pc	ΔPA deg	z	O.I.	RM×$(1+z)^2$ rad m^{-2}
0127+233 3C43	a	225	780	93	1.459	Q	−1088
0358+004 3C99	b	15	46	60	0.425	G	40
0429+415 3C119	c	39	142	55	1.023	Q	3400
0538+498 3C147	d	200	664	90	0.545	Q	−3222/621
0548+165	e	80	253	90	0.474	Q	1934
1328+254 3C287	f			58	1.055	Q	–
1442+101 OQ172	g	15	39	90	3.531	Q	22400
1629+680 4C68.18	h	76	226	66	2.475	Q	–
1741+279 B2	e	300	862	84	0.372	Q	−219/293
2033+187	e	40	129	80	(0.5)	–	n
2147+145	e	23	75	90	(0.5)	–	n

Note: In column 8, the mark - means no measurements available, the mark n means polarization not detected. References: a - Spencer at al. (1991); b - Mantovani et al. (1992); c - Nan Ren-dong et al. (1991); d - Alef et al. (1990); e - **this investigation**; f - Fanti et al. (1989); g - Dallacasa et al. (1995); h - Dallacasa et al. (in preparation)

cases. Features common to these sources are: (a) - a core-jet structure; (b) - a change in the jet major axis Position Angle $\Delta PA > 50°$; (c) - a bend that occur at a linear separation which is < 1 kpc from the core.

Their *mas scale* structures lend support for the view of a strong interaction between the jet flow and dense gas clouds. Norman & Balsara (1993) have investigated the physics of a jet/cloud collision with 3-D hydrodynamical simulations. Their work reveals interesting features that further support this interpretation. For example, the reflected jet inherits the stability properties of the original jet. Nevertheless, the images of sources like 3C119, 0548+165 and 3C287 represent a puzzle since they would require more than one collision to produce structures that are spiral-like or bent by about 180°.

References

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