1 Gabuzda

Jean-Pierre De Villiers *Question* You mention that you would like to see simulations done for AGN/jets. What is your wish list for such simulations? What answers would you like these simulations to answer?

Answer Two types of simulations/calculations come to mind immediately:

1. Simulations to test the scenario in which a lower density of gas may lead to a lower accretion rate, and a lower accretion rate to lower outflow speeds for the jets. Also, simulatins to gain a better understanding of lower gas density vs lower flux of ionizing radiation from the central regions as origins of the lower line luminosity / lower core Faraday rotation in BL Lac objects vs quasars

2. We need simulations/calculations to better understand what types of rotation measure profiles we should actually observe if the jets and surroundings have helical/toroidal B fields that give rise to rotation-measure gradient perpendicular to the jets. This will also help us move toward using the observed rotation-measure gradients as a tool to desent angle the jet velocities and angles to the line of sight

Martin Hardcastle *Question* A comment and a question

1. I'm concerned about the use of the observed distribution of speeds to infer possible physical differences between BL Lacs and quasars. That aside,

2. As these two classes of objects will unify with FRI and FRII radio sources respectively, do you think there may be intrinsic differences between the two classes on the parsec scale?

Answer Certainly, we cannot unambiguously separate the contributions of intrinsic speed and angle to the line of sight to differences in the observed apparent superluminal speeds of BL Lac objects and quasars – I have considered the idea that the difference in apparent superluminal speeds reflects primarily a difference in physical speeds only as one possibility.

I do think that there is good evidence for intrinsic differences between BL Lacs and quasars on parsec scales. The most striking of these are differences in the most typical inferred magnetic-field structure: quasars most often display roughly longitudinal jet B fields, while BL Lacs most often display roughly transverse jet B fields. I think that part of our challenge in understanding these objects is to tie in the observed differences in parsec-scale behaviour for BL Lacs and quasars (apparent superluminal speeds, B-field structure, VLBI core Faraday rotaion) with the fact that the BL Lac objects (and FRI radio galaxies) have less luminous optical line emission than quasars (and FRII radio galaxies)

David Meier *Question* First of all, I want to say that your idea for explaining the difference between BL Lacs and Quasars (less gas to accrete implies slower jet, etc.) is not implausible. It may even turn out to be correct - but much more theoretical work needs to be done before we can say much more.

Secondly, I have two quick questions:

1. What are the average Lorentz factors you derive for Quasars and BL Lacs?
2. Were the objects in your optical vs radio polarization angle histogram Quasars, BL Lacs, or a mixture of the two?

Answers I'm glad that your intuition suggests that the possible senario that I suggested is plausible! Obviously, this can only be speculative without some sort of simulations to better demonstrate under what conditions lower gas density will lead to lower accretion rates and lower outflow velocities.

The observed distributions of apparent speeds for BL Lac objects and quasars overlap, but the BL Lac speeds are, on average, lower. The inferred difference in Lorentz factors may be something like 3-5 for BL Lacs and 5-10 for quasars

The objects in our histogram of optical minus radio polarization angles were all BL Lac objects, except for 3C279 (which is a closely related blazar). We are now in the porcess of reducing analogous data for a sample of quasars, and we should have some idea by the end of the summer whether the quasars are showing the same optical - VLBI core polarization angle correction.