Accretion Phenomena and Related Outflows, IAU Colloquium 163
ASP Conference Series, Vol. 121, 1997
D.T. Wickramasinghe, L. Ferrario, and G.V. Bicknell, eds.

Outflow Angles and Bulk Lorentz Factors for Different Categories of AGN

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Abstract. Relativistic outflows from AGN can be parameterized by θ, the angle subtended by the direction of the outflow and the line of sight to the observer, and γ, the bulk Lorentz factor of the outflow. The Doppler factor, δ, and the apparent speed in the plane of the sky, β_{app}, are combinations of θ and γ. The Doppler factor can be estimated using either the equipartition Doppler factor, δ_{eq} (Readhead 1994), or the inverse Compton Doppler factor, δ_{IC}. These Doppler factor estimates are combined with observed β_{app} to solve for θ and γ for different categories of AGN.

Ghisellini et al. (1993) compute δ_{IC} for 105 compact radio sources, and Güijosa & Daly (1996) compute δ_{eq} for the same sample. Daly, Guerra, & Güijosa (1996) estimate θ and γ for the 43 sources that have β_{app} listed by Vermeulen & Cohen (1994) and δ_{eq} computed by Güijosa & Daly (1996).

Solutions and errors for θ and γ are presented in Figures 1 and 2 using δ_{eq} and δ_{IC} respectively. Guerra & Daly (1996) discuss these estimates and errors in greater detail. These AGN fall into the following categories: BL Lacertae objects (BL Lacs), core-dominated high-polarization quasars (CDHPQ), core-dominated low-polarization quasars (CDLPQ), core-dominated quasars with no polarization information (CDQ(NPI)), lobe-dominated quasars (LDQ), and radio galaxies (RG).

Acknowledgments. This work supported in part by the U.S. National Science Foundation through a Graduate Student Fellowhsip and a National Young Investigator Award.

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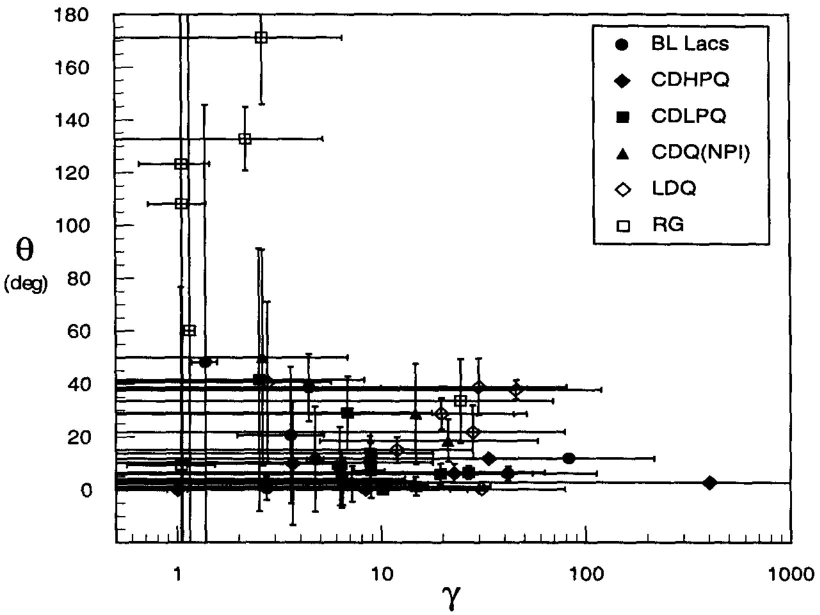

Figure 1. Estimates of θ vs. γ using δ_{eq} and β_{app}.

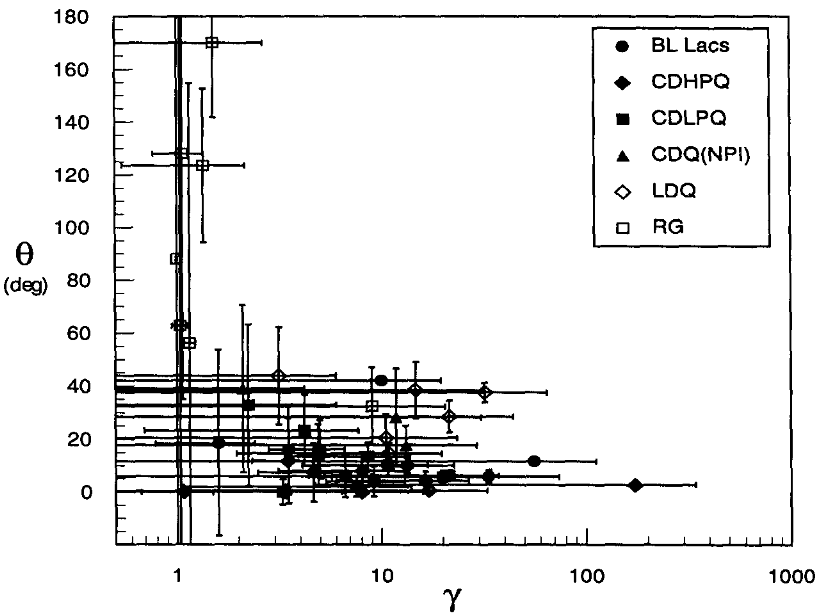

Figure 2. Estimates of θ vs. γ using δ_{IC} and β_{app}.

https://doi.org/10.1017/S0252921100043475 Published online by Cambridge University Press