Miami Physics Conference 2022

Ruth Daly

Title: Black Hole Spin Mass–Energy Characteristics for 100 FRII Sources Obtained with a New Method

Spin energy is a key parameter describing astrophysical black holes since it contributes in part to the total black hole mass and can be extracted thereby impacting the black hole environment. A new method to empirically determine the spin mass-energy characteristics of astrophysical black holes will be presented and applied. Results are obtained for a sample of 100 supermassive black holes associated with classical double radio sources with collimated dual outflows and redshifts between about zero and two. An analysis indicates that about two-thirds of the black holes are maximally spinning, while one-third have a broad distribution of spin values. The new method is applied to obtain the spin mass-energy available for extraction relative to the maximum possible value, and relative to the irreducible black hole mass and the dynamical black hole mass. The new method has broad applications for astrophysical black holes, which will be discussed.