Contribution ID: **63** Type: **Talk**

The fastest jets from stellar mass black holes are tied to the black hole spin axis

Despite a century of study, the long-sought connections between the physics of black holes and the processes underpinning the formation and launch of jets, their composition, energy content, and propagation remain elusive. Here we present the first statistically significant sample of accurately estimated transient jet speeds from accreting stellar mass black holes and neutron stars, the most rapidly evolving examples in the relativistic jet zoo. These jets span a wide range of speeds, and while in some cases they show precession (changes in the jet launch direction), others remain oriented at a fixed angle
across multiple events. The fastest jets are exclusively from black holes and are always fixed in direction, which must correspond to the projection of the spin axis of the black hole. This is the first unambiguous evidence of a connection between black hole spin and jet formation in these systems. However, we find no correlation between reported spin estimates and the jet speeds, suggesting that some issues remain in connecting the theories of jet formation with spin measurements. In contrast to the fastest jets, mildly relativistic jets can be produced by both black holes and neutron stars, and are often observed to precess. These results lead us to a new jet paradigm for accreting stellar mass black holes and neutron stars that explains fast, fixed-axis and slow, precessing jets as spin-locked and disc-launched respectively.

Contribution

Oral talk

Affiliation

University of Oxford

E-mail

rob.fender@physics.ox.ac.uk

Authors: FENDER, Rob (University of Oxford); MOTTA, Sara Elisa (Istituto Nazionale di Astrofisica (INAF))

Presenter: FENDER, Rob (University of Oxford)

Session Classification: Jets (Observation, theory and modelling)

Track Classification: Talk