Contribution ID: **155** Type: **contributed talk**

Probing the dynamics of AGN jets with advanced semi-analytical modelling

Tuesday, 9 July 2019 12:20 (15 minutes)

The jets launched by accreting super-massive black holes can be some of the brightest sources in the high-energy sky. However, despite being discovered decades ago, their physics and energetics are still poorly understood. The past decade has seen a dramatic improvement in the quality of available multi-wavelength data, particularly in the X-ray and γ-ray bands. However, the semi-analytical modelling of jets has advanced slowly, and simple one-zone models are still the preferred method of interpreting data, in particular for AGN jets. These models can roughly constrain the properties of jets but they can not unambiguously couple their emission to the launching regions and internal dynamics, which are usually probed with simulations. On the other hand, simulations are not easily comparable to observations because they cannot yet self-consistently predict spectra. I will discuss our group's ongoing efforts to develop a more advanced semi-analytical model which accounts for the dynamics of the whole jet, starting from a simplified parametrization of Relativistic Magnetohydrodynamics in which the magnetic flux is converted into bulk kinetic energy. We apply our model to state-of-the-art datasets, including recent observations taken during the Event Horizon Telescope multi-wavelength campaign, which combine combine multi-wavelength SEDs and direct VLBI imaging of the jet. Thanks to the quality of our data we are able to conduct a thorough exploration of parameter space. Compared to previous modelling efforts this approach produces some of the best SED fits for these sources to date and provides stronger constraints on jet internal properties physics.

Primary author: LUCCHINI, Matteo (Anton Pannekeok Institute for Astronomy)

Co-authors: Prof. MARKOFF, Sera (Anton Pannekeok Insittute for Astronomy); Dr KRAUSS, Felicia (Anton Pannekoek Institute fro Astronomy); Dr CRUMLEY, Patrick (Princeton University); Dr CONNORS, Riley (California Institute for Technology)

Presenter: LUCCHINI, Matteo (Anton Pannekeok Institute for Astronomy)

Session Classification: Formation and propagation of relativistic outflows

Track Classification: Formation and propagation of relativistic outflows