



Contribution ID: 55

Type: **not specified**

## Theory vs. observations: Unraveling black hole accretion physics with the Event Horizon Telescope

*Wednesday, 18 September 2019 11:50 (20 minutes)*

The Event Horizon Telescope (EHT) is a global VLBI array with the capability to study millimetre wave emission from extragalactic radio sources with an unprecedented micro-arcsecond resolution. In a 2017 observing run, the EHT observed M87 and Sgr A\* - the two primary EHT targets - alongside several other AGN sources. Eight telescopes participated in this observing session, including the phased-up Atacama Large Millimeter/submillimeter Array.

In this talk, I will present a novel synthetic data generation pipeline designed for the EHT, called SYMBA. This pipeline is able to accurately predict EHT measurements for any theoretical source model as it creates realistic data corruption effects and passes the synthetic data through the full EHT calibration and imaging machinery. SYMBA is used to directly compare EHT observations with general relativistic magnetohydrodynamics (GRMHD) simulations. First, I will showcase the current capabilities of the array to resolve the shadow of the supermassive black hole in the center of M87. Then, I will predict how an increase in sensitivity and resolving power will soon enable the EHT to probe the electron distribution function of hot emitting plasma surrounding the central nucleus of M87. The necessary enhancement will already arrive in 2020 with the addition of the Greenland Telescope, Kitt Peak station, and phased IRAM NOEMA interferometer to the EHT array.

**Primary authors:** Mr JANSSEN, Michael (Radboud University); Mr ROELOFS, Freek (Radboud University); EHT COLLABORATION

**Presenter:** Mr JANSSEN, Michael (Radboud University)

**Session Classification:** Frontiers of MHD simulations at all scales: jets, outflows, and intracluster medium