Contributed Talk

Splinter AGN

# OJ287 – Deciphering the Rosetta stone of blazars

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OJ287 is the best candidate Active Galactic Nucelus (AGN) for hosting a supermassive binary black hole (SMBBH) at very close separation. Periodicities in the historical optical light-cuve (1890-now) have been modeled successfully within an SMBBH scenario (e.g., Valtonen et al. 2016). At a redshift of z=0.306 and with a mass of more than $10^{10}M_{\odot}$, OJ287 is one of the few AGN which promises to allow observations on event horizon scales. OJ287 has thus been observed with the Event Horizon Telescope (EHT) project in April this year.

We studied this source in 118 Very Long Baseline Array (VLBA) observations (at 15 GHz) covering the time between Apr. 1995 and Jan. 2017.

To our knowledge this is the first time, that the kinematics of the spine (originating in the ergosphere of a rotating black hole) and sheath (originating from the accretion disk) of a jet are seen and traced in observations. We find that the OJ287 jet is rotating and precessing. The rotation explains the radio variability via viewing angle changes and Doppler beaming. Half of the jet-precession timescale is of the order of the dominant optical periodicity timescale. We suggest that the optical emission is produced by the synchrotron mechanism and is thus related to the jet radition. All the observed phenomena can be understood in terms of geometrical effects. Disturbances of an accretion disk caused by a plunging black hole do not seem necessary to explain the observed variability. Although the binary black hole model does not seem necessary to explain the observed variability, a binary model seems to be required to explain the time scale of the precessing motion. Lense-Thirring precession explains the time scales as well.