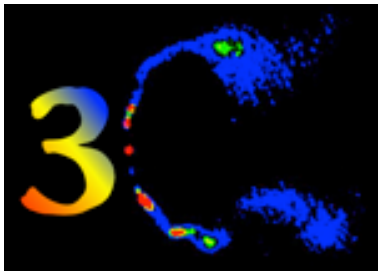

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M87 black hole mass from observations of a jet shape break

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The change in a boundary shape of a jet in M87 was discovered first by Asada and Nakamura (2012). This jet is characterized by the initially quasi-parabolic flow changing into the approximately conical one. We propose that the change in a jet boundary shape is due to a transition of an outflow from the Poynting dominated to particle-dominated (equipartition) regime. We propose a model with an electric current closed inside a jet (Beskin et al. 2017). This assumption ensures the absence of a current sheet at the jet boundary, which may affect a jet stability in a positive way. Within this model, we are able to reproduce exactly the observed jet boundary shape behavior adopting the ambient pressure is due to a Bondi accretion flow. Assuming the presence of a dynamically important magnetic field, we are able to find the mass and spin of a super massive black hole in M87. The obtained mass is larger than accepted so far, while the spin has a moderate value of ~0.1.

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