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# Modeling the inner part of the jet in M87: Confronting jet morphology with theory

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The formation of jets in black hole accretion systems is a long-standing problem. It has been proposed that a jet can be formed by extracting the rotation energy of the black hole ( “BZ-jet” ) or the accretion flow ( “disk-jet” ). While both models can produce collimated relativistic outflows, neither has successfully explained the observed jet morphology. By using general relativistic magnetohydrodynamic simulations and considering nonthermal electrons accelerated by magnetic reconnection that is likely driven by magnetic eruption in the underlying accretion flow, we obtain images by radiative transfer calculations and compared them to millimeter observations of the jet in M87. We find that the BZ-jet originating from a magnetically arrested disk around a high-spin black hole can well reproduce the jet morphology, including its width and limb-brightening feature.

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