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Multi-wavelength Emission from Jets and Magnetically Arrested Disks in Radio Galaxies

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The emission mechanisms and regions of multi-wavelength photons from radio galaxies are unknown. The emission from Magnetically Arrested Disks (MADs) with strong magnetic fields at the center of radio galaxies can explain the high-energy gamma-ray data, but the MAD model cannot explain the observational X-ray data. One possible scenario to explain radio to X-ray data is the emission from jets. We construct the model of multi-wavelength emission from the jets and the MADs using the particle injection model based on magnetic reconnection in the black hole magnetosphere. We apply the hybrid model to M87 and compare it with the observed data. High magnetization parameter in the jets is required to explain the multi-wavelength observational data. Due to the high magnetization parameter, the synchrotron self-Compton in the jets does not contribute to the observational high-energy gamma-ray data. In this case, the magnetic field in the jets is consistent with the estimated value from the radio core shift observation.

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