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Centimeter-band Variability in 3C 273, 3C 279, and 3C 345 as a Probe of Jet Evolution

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The very bright, active quasars 3C 273, 3C 279, and 3C 345 are key objects in variability studies across the electromagnetic spectrum, and the first report of large fractional variations in radio emission in 1965 was based on observations of these 3 sources obtained with the University of Michigan 26-meter paraboloid. These structurally-complex 3C objects were subsequently monitored for over 40 years with the Michigan dish (UMRAO) providing a continuous record of total flux density variability at 8 GHz over 4 decades, and of all Stokes variability at 14.5, 8.0, and 4.8 GHz since the late 1970s. The resulting archival data set provides information on the simultaneous spectral evolution of the total and polarized flux on decadal timescales over multiple, consecutive outbursts occurring in the parsec-scale jet flow, yielding clues to the origin of changes in the underlying jet properties. Complementary VLBA 15 GHz images from MOJAVE during the last decade of UMRAO operation permit resolving the emission contributions from core and jet components, and the combined single dish and VLBI data provide insights into the effects of changes in inner jet orientation on the observed source-integrated emission (geometric effects). Investigations have included searches for periodic behavior, potentially indicative of jet precession, and identification of temporal changes in the magnetic field orientation relative to the jet flow direction. I discuss major results and their implications.

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