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Expanding T^2-Symmetric Vacuum Cosmological Spacetimes BEVERLY K. BERGER, Retired — The most general T^2-symmetric vacuum cosmological spacetimes may be obtained from Gowdy T^3 spacetimes by adding off-diagonal "twist" components to the spatial metric. In the collapse direction, these spacetimes exhibit local Mixmaster dynamics in contrast to local Kasner behavior of the Gowdy models. While understanding the dynamics at every spatial point in the collapsing spacetimes describes their dominant phenomenology (with the apparent exception of non-local spike solutions), the expanding spacetimes are studied in terms of the influence of the gravitational waves they contain upon the evolution of the "background" spacetime. We discovered some time ago that the spatial averages of a natural set of variables describing the T^2-symmetric spacetimes exhibit a peculiar attractor-like behavior. This may be understood heuristicly in terms of various nonlinear terms in the relevant Einstein equations. Recently, Ringström has provided a rigorous basis for some of the numerical findings. We shall discuss new numerical and mathematical results for these spacetimes. It should be noted that, in contrast to the collapse case, matter will dominate an expanding cosmological spacetime. Thus, the results for these vacuum spacetimes are not applicable to the actual universe.

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