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Numerical Relativity as a tool for studying the Early Universe DAVID GARRISON, University of Houston Clear Lake — Numerical simulations are becoming a more effective tool for conducting detailed investigations into the evolution of our universe. In this presentation, I show how the framework of numerical relativity can be used for studying cosmological models. We are working to develop a large-scale simulation of the dynamical processes in the early universe. These take into account interactions of dark matter, scalar perturbations, gravitational waves, magnetic fields and a turbulent plasma. The code described in this report is a GRMHD code based on the Cactus framework and is structured to utilize one of several different differencing methods chosen at run-time. It is being developed and tested on the Texas Learning and Computation Center's Xanadu cluster.

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