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**Spritz code: Improving the robustness of GR Magnetohydrodynamics**[1] JAY VIJAY KALINANI, University of Padova, Italy, RICCARDO CIOLFI, INAF - Astronomical Observatory of Padova, Italy, WOLFGANG KASTAUN, Max Planck Institute for Gravitational Physics (AEI), Hannover, Germany, FEDERICO CIPOLLETTA, Center for Computational Relativity and Gravitation, Rochester Institute of Technology, USA, BRUNO GIACOMAZZO, University of Milan-Bicocca, Italy — General relativistic magnetohydrodynamic (GRMHD) simulations are an indispensable tool to obtain a detailed physical understanding of binary neutron star (BNS) mergers. Flux-preserving GRMHD codes numerically evolve a set of conservative equations based on conserved variables which then need to be converted back to the primitive physical variables. The corresponding conservative-to-primitive (c2p) recovery procedure is a crucial aspect at the core of any GRMHD code. In this talk, I will discuss a completely new c2p recovery scheme for ideal MHD. Using both stand-alone tests and by performing demanding three-dimensional GRMHD tests, we have demonstrated robustness, accuracy, and efficiency over the whole relevant parameter space. This includes the critical case of very strong magnetizations. I will also talk about technical aspects of implementing the scheme in our new GRMHD code Spritz, such as the requirements for the EOS framework.

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