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HYDRODYNAMIC SIMULATIONS OF SUPERNOVA REMNANTS ENCOUNTERING HIGH DENSITY ENVIRONMENT

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In this work we develop three-dimensional numerical simulations, based on PLUTO code (Mignone et al. ApJS (2012) 198, 7M) in order to simulate hydrodynamic, and radio evolution of supernova remnants in non-homogeneous interstellar matter. The supernova remnant, and the interstellar matter around it, used in the simulations are based on 3C396 that has higher concentration of interstellar medium positioned on one side, instead of uniform distribution. The simulations are performed by modifying additions to basic PLUTO code, made by previous researchers, such as calculation of shock modification by cosmic rays, cosmic ray acceleration by mechanism of non-linear diffusive shock acceleration, and magnetic field amplification caused by combined effect of resonant, and non-resonant instabilities. Results include comparison of radio evolution tracks, and time evolution of parameters such as radius, pressure, adiabatic index, magnetic field strength, morphology of the remnant, etc. between homogeneous, and non-homogeneous supernova remnant surroundings.