

## THE NEW COARRAY FORTRAN CODE FOR NUMERICAL MODELING IN SPECIAL RELATIVISTIC HYDRODYNAMICS

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### RESUMEN

Se presenta un nuevo código paralelo basado en modelos de hidrodinámica relativista especial para describir flujos que interactúan. Se estudia y verifica un nuevo método numérico de gran precisión. Se describe en detalle una implementación paralela del método mediante la tecnología Coarray Fortran y su eficiencia. La escalabilidad del código es del 92% en un cluster con Intel Xeon 6248R NKS-1P con 192 imágenes Coarray Fortran. Se consideran aplicaciones astrofísicas diferentes flujos relativistas interactuantes.

### ABSTRACT

A new parallel code based on models of special relativistic hydrodynamics is presented for describing interacting flows. A new highly accurate numerical method is considered and verified. A parallel implementation of the method by means of Coarray Fortran technology and its efficiency are described in detail. The code scalability is 92% on a cluster with Intel Xeon 6248R NKS-1P with 192 Coarray Fortran images [1]. Different interacting relativistic flows are considered astrophysical applications.

*Key Words:* Relativistic fluid dynamics — Hydrodynamical simulations

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