

# A class of well-balanced algorithms for relativistic fluids on a Schwarzschild background

Philippe G. LEFLOCH\*

I will present a joint work in collaboration with Carlos Parés and Ernesto Pimentel-García.

For the evolution of a compressible fluid in spherical symmetry on a Schwarzschild curved background, we have designed a class of well-balanced numerical algorithms up to third-order accuracy. We treated both the relativistic Burgers-Schwarzschild model and the relativistic Euler-Schwarzschild model and took advantage of the explicit or implicit forms available for the stationary solutions of these models.

Our schemes follow the finite volume methodology and preserve the stationary solutions and, most importantly, allow us to investigate the global asymptotic behavior of such flows and determine the asymptotic behavior of the mass density and velocity field of the fluid.

## References

- [1] P.G. LeFloch, C. Parés, E. Pimentel-García. A class of well-balanced algorithms for relativistic fluids on a Schwarzschild background. *Journal of Scientific Computing*, 89: 1–43, 2021.

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\*Laboratoire Jacques-Louis Lions & Centre National de la Recherche Scientifique, Sorbonne Université, 4 Place Jussieu, 75252 Paris, France. Email: [contact@philippefloch.org](mailto:contact@philippefloch.org). Blog: [philippefloch.org](http://philippefloch.org)