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cases			**authors**	• Olindo Zanotti • Michael Dumbser	**DUPLICATES**	**162**
			title	Efficient conservative ADER schemes based on WENO reconstruction and space-time predictor in primitive variables		
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	authors	• Olindo Zanotti • Michael Dumbser	**source**	SupportedSources.ARXIV		
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	title	Efficient conservative ADER schemes based on WENO reconstruction and space-time predictor in primitive variables	**volume**			
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	source	SupportedSources.OPENALEX	**urls**	• http://arxiv.org/pdf/1511.04728v2 • http://arxiv.org/abs/1511.04728v2 • http://arxiv.org/pdf/1511.04728v2		
	journal	Computational Astrophysics and Cosmology				
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	doi	10.1186/s40668-015-0014-x	**id**	id-9064900862523186648		
	urls	• https://openalex.org/W2964239067 • https://doi.org/10.1186/s40668-015-0014-x • https://comp-astrophys-cosmol.springeropen.com/track/pdf/10.1186/s40668-015-0014-x	**abstract**	We present a new version of conservative ADER-WENO finite volume schemes, in which both the high order spatial reconstruction as well as the time evolution of the reconstruction polynomials in the local space-time predictor stage are performed in primitive variables, rather than in conserved ones. Since the underlying finite volume scheme is still written in terms of cell averages of the conserved quantities, our new approach performs the spatial WENO reconstruction twice: the first WENO reconstruction is carried out on the known cell averages of the conservative variables. The WENO polynomials are then used at the cell centers to compute point values of the conserved variables, which are converted into point values of the primitive variables. A second WENO reconstruction is performed on the point values of the primitive variables to obtain piecewise high order reconstruction polynomials of the primitive variables. The reconstruction polynomials are subsequently evolved in time with a novel space-time finite element predictor that is directly applied to the governing PDE written in primitive form. We have verified the validity of the new approach over the classical Euler equations of gas dynamics, the special relativistic hydrodynamics (RHD) and ideal magnetohydrodynamics (RMHD) equations, as well as the Baer-Nunziato model for compressible two-phase flows. In all cases we have noticed that the new ADER schemes provide less oscillatory solutions when compared to ADER finite volume schemes based on the reconstruction in conserved variables, especially for the RMHD and the Baer-Nunziato equations. For the RHD and RMHD equations, the accuracy is improved and the CPU time is reduced by about 25%. We recommend to use this version of ADER as the standard one in the relativistic framework. The new approach can be extended to ADER-DG schemes on space-time adaptive grids.		
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