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SPH numerical simulation of fluid flow through a porous media¹ JAIME KLAPP-ESCRIBANO, Cinvestav, Mexico and ININ, Mexico, ESTELA MAYORAL-VILLA, MARIO ALBERTO RODRIGUEZ-MEZA, EDUARDO DE LA CRUZ-SANCHEZ, ININ, Mexico, LEONARDO DI G SIGALOTTI, IVIC, Venezuela, ININ-ABACUS COLLABORATION, IVIC COLLABORATION — We have tested an improved a method for 3D SPH simulations of fluid flow through a porous media using an implementation of this method with the Dual-Physics code. This improvement makes it possible to simulate many particles (of the order of several million) in reasonable computer times because its execution on GPUs processors makes it possible to reduce considerably the simulation cost for large systems. Modifications in the initial configuration have been implemented in order to simulate different arrays and geometries for the porous media. The basic tests were reproduced and the performance was analyzed. Our 3D simulations of fluid flow through a saturated homogeneous porous media shows a discharge velocity proportional to the hydraulic gradient reproducing Darcy's law at small body forces. The results are comparable with values obtained in previous work and published in the literature for simulations of flow through periodic porous media. Our simulations for a non saturated porous media produce adequate qualitative results showing that a non steady state is generated. The relaxation time for these systems were obtained.

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