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Large-Eddy Simulations of turbulent hydrodynamic and magnetohydrodynamic channel flows AXELLE VIRE, Physique Statistique et des Plasmas, Universite Libre de Bruxelles, B-1050 Brussels, Belgium, DMITRY KRASNOV, Fakultat fur Maschinenbau, Technische Universitat Ilmenau, P.O. Box 100565, 98684 Ilmenau, Germany, BERNARD KNAEPEN, Physique Statistique et des Plasmas, Universite Libre de Bruxelles, B-1050 Brussels, Belgium, THOMAS BOECK, Fakultat fur Maschinenbau, Technische Universitat Ilmenau, P.O. Box 100565, 98684 Ilmenau, Germany — We perform Large-Eddy Simulations of incompressible hydrodynamic and magnetohydrodynamic channel flows at low magnetic Reynolds numbers (i.e. in the framework of the quasi-static approximation where the Lorentz force is treated as an explicit contribution to the momentum balance). The computations are performed using a pseudospectral and a second-order collocated finite volume method. Two eddy-viscosity type models are compared for different mesh resolutions: the dynamic Smagorinsky (DSM) and the Wall-Adapting Local Eddy-viscosity (WALE) model. We examine in detail the contributions to the kinetic energy budget of each term appearing in the Navier-Stokes equations. In particular, the results show that the subgrid-scale dissipation measured in the finite volume simulations is systematically much lower than in the spectral ones.

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