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Solar convection zone dynamics

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A comprehensive understanding of the solar magnetic cycle requires detailed modeling of the solar interior including the maintenance and variation of large scale flows (differential rotation and meridional flow), the solar dynamo and the flux emergence process connecting the magnetic field in the solar convection zone with magnetic field in the photosphere and above. Due to the vast range of time and length scales encountered, a single model of the entire convection zone is still out of reach. However, a variety of aspects can be modeled through a combined approach of 3D MHD models and simplified descriptions. We will briefly review our current theoretical understanding of these processes based on numerical models of the solar interior.

Comments: 12 pages, 1 figure, to appear in IAGA Special Sopron Book Series, "The Sun, the Solar Wind and the Heliosphere", eds. M. Paz Miralles & J. Sanchez Almeida

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