

# Convection in Spheres: A Comparison of Spectral, Spectral-Element, and Finite-Element Approaches

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**Abstract:** Convection in spherical domains is an important application with relevance to planetary and stellar convection. Although these various regimes differ in crucial respects, nevertheless as a starting point one can consider modeling them as incompressible flows under the Boussinesq approximation. In keeping with the theme of this conference, we describe results for modeling convection in spherical domains using the spectral, spectral-element and finite-element methods with an aim of comparing these strategies for this problem. Performance results of modeling similar physics with these methods are presented. Implications for more detailed models that incorporate more physics are discussed.