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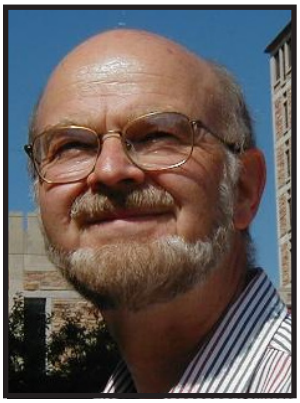
PHYSICS COLLOQUIUM

Probing the Sources of Solar Magnetism with Helioseismology and Simulations



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Host: Forest and Zweibel

Abstract: There exist major challenges to understand how the Sun builds the large-scale and intense magnetic fields that we observe at its surface and how these fields evolve in time. The origin of these magnetic fields must rest with dynamo processes occurring deep within the star. Many complex dynamical elements are involved in the operation of the solar global dynamo. These include the differential rotation of the convection zone and the tachocline at its base, turbulent production and transport of the magnetic fields by the convection, shear amplification of the fields, and magnetic buoyancy that leads to the eventual field eruption onto the photosphere. Major advances in supercomputing are allowing us to improve the fidelity with which we can model these intensely turbulent processes. These efforts are aided by continuing guidance provided by helioseismology in probing dynamics in the solar interior. We discuss the close interplay between helioseismology and recent 3-D simulations in studying the solar global dynamo.

2241 Chamberlin Hall • Friday, February 29, 2008 • 4:00 P.M.