



HAO Colloquium Series

(Refreshments served)

Speaker: Gustavo Guerrero, Stanford University

Time: 1:30–2:30 pm

Date: Wednesday, January 25, 2012

Location: CG1-South Auditorium

Title: Dynamo action and magnetic buoyancy in convection simulations with vertical shear

Abstract:

One of the existing hypotheses on sunspot formation is the buoyant emergence of magnetic flux tubes created by the strong vertical shear at the tachocline. In this scenario, the magnetic field has to exceed a threshold value before it becomes buoyant and rises through the convection zone to the surface. Besides, several physical constraints are required to be fulfilled for this model to be feasible. In this seminar I will present the results of numerical simulations of compressible turbulent convection including a narrow vertical shear layer. Like the solar tachocline, the shear is located at the interface between convective and stable layers. The excitation of dynamo action as well as the buoyant properties of the generated magnetic field is explored under different conditions. The implications of the results on the sunspot formation process and the solar dynamo will also be discussed.