HAO Colloquium Series

(Refreshments served)

Speaker: **Hideyuki Hotta, University of Tokyo**

Time: **3:00–4:00 pm**

Date: **Wednesday, August 8, 2012**

Location: **CG1-2126**

Title: **Studies of the solar convection zone using Reduced Speed of Sound Technique and Adaptive Mesh Refinement**

Abstract:

Our new numerical code using Reduced Speed of Sound Technique (RSST) and Adaptive Mesh Refinement (AMR) and its results will be introduced in the seminar. Numerical calculation for the solar convection zone has two difficulties. One is the high speed of sound. At the base of convection zone, the speed of sound is 200km/s, which is more than 1000 times faster than the convection velocity and the Alfven velocity. The time step must therefore be shorter owing to the CFL condition in an explicit fully compressible method, even when we are interested in phenomena related to convection and magnetic field. The second difficulty is the thin magnetic flux tube. The observations of active region suggest that at the base of the convection zone the radius of magnetic flux tube is about 1000 km, which is much smaller than the thickness of the solar convection zone (200 Mm). This suggests that the strong magnetic field is highly localized. A proper treatment of magnetic flux tube requires high resolution. These two difficulties can be resolved using RSST and AMR.

In the seminar, new approach and its results about generation of twist on magnetic flux tube will be given. I will also talk about the future perspective of the solar global convection using above methods.