



## Physical Research Laboratory, Ahmedabad

### COLLOQUIUM - 13 – 17

**Speaker:** Mr. Vemareddy Panditi  
Post Doctoral Fellow, Udaipur Solar Observatory, Udaipur.

**Title:** On the Magnetic Field Structure and Evolution of flare/CME productive Solar Active Regions

#### Abstract

Solar flares and Coronal Mass Ejections (CMEs) are energetic, explosive transient events releasing enormous amounts of energy due to sudden destabilization of magnetic field structure in the active regions. Although, flares and CMEs are two different aspects of a large-scale magnetic energy release of the same magnetically driven phenomenon, there is no clear one-to-one relationship between them. Large flares and CMEs are the primary causes of space-weather disturbances; therefore there is need to understand the underlying physics and associated phenomena in these events.

A fundamental aspect of the eruption involves gradual storage of magnetic energy of the active region by various mechanisms and its release. As the field lines originate from, and line-tied to, the dense photosphere, plasma motions can stress the field lines to store energy that might lead the system to a magnetically unstable state. So, the complexity of field line connectivity and the non-potential state of active region is defined by flux motions. After the magnetic system of the active region has reached a state of sufficiently adequate energy, its sudden release requires a suitable triggering mechanism to drive the eruption. I will discuss in detail various processes of energy storage and triggering mechanism of these eruptions during the evolution of the active regions. The 3-D magnetic field structures of ARs evolve gradually in response to the photospheric flux motions and also catastrophically as a result of transient events. In the absence of the measurements above chromosphere, one can resort to the technique of magnetic field extrapolations using the photospheric observations as the boundary conditions. Therefore, the models of constructing active region 3-D magnetic fields to coronal heights under force-free assumption using photospheric magnetic field observations and their validity with the coronal EUV observations will also be discussed.

#### The Speaker

Mr. Vemareddy Panditi got his M.Sc degree in Physics from University of Hyderabad in 2008. He then joined Physical Research Laboratory as a research scholar and submitted his research work on magnetic field structure and evolution of flaring solar active regions for a Ph.D. degree in April, 2013. For his contributions in the field of his research he is recently awarded with the American Astronomical Society-Solar Physics Division Zirin Studentship Award, 2013.

**Wednesday: 31 July, 2013, 16:00 hrs**

**K.R. Ramanathan Auditorium, PRL**

**Tea at 15:30 hrs**

**ALL ARE WELCOME**