

A theoretical model for the magnetic helicity of solar active regions

A.R. Choudhuri (1), P. Chatterjee (1), K. Petrovay (2) and D. Nandy (3)

(1) Department of Physics, Indian Institute of Science, Bangalore - 560012, India, (2) Department of Astronomy, Eotvos University, Budapest, Pf. 32, 1518, Hungary, (3) Department of Physics, Montana State University, Bozeman, MT 59717-3840, USA

Active regions on the solar surface are known to possess magnetic helicity, which is predominantly negative in the northern hemisphere and positive in the southern hemisphere. Choudhuri (2003; *Sol. Phys.* 123, 217) proposed that the magnetic helicity arises due to the wrapping up of the poloidal field of the convection zone around rising flux tubes which form active regions. Choudhuri, Chatterjee and Nandy (2004; *ApJ* 615, L57) used this idea to calculate magnetic helicity from their solar dynamo model and found broad agreements with observational data. Chatterjee, Choudhuri and Petrovay (2006; *A&A*, in press) have studied the penetration of the wrapped poloidal field into the rising flux tube and concluded that more detailed observational data will throw light on the physical conditions of flux tubes just before their emergence to the photosphere.