Session 2

The stability of sunspots and pores related to the magnetic field properties

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We will summarize the recent observational results that show the key role played by the vertical component of the magnetic field ($B_{||}$) in the inhibition of convection in the solar photosphere. In sunspots and pores, only regions with $B_{||}$ stronger than a critical value of approximately 1.8 kG are stable against convection and the intensity boundaries of stable umbrae and pores match boundaries based on $B_{||}$. In regions with $B_{||}$ weaker than the critical value, more vigorous modes of magneto-convection take over. This behavior is observed during the formation of penumbra and light bridges and during the decay of sunspots and pores. Current case studies of pore evolution indicate that also areas defined by the critical value of $B_{||}$ decay rapidly in the final stages of pores lifetime. However, we observe a clear relation between the decay rates of areas defined by intensity threshold and by $B_{||}$: the evolution of areas defined by $B_{||}$ precede by approximately four hours the evolution of areas defined by intensity threshold.