

# **The multi-wavelength study of the effect of energetic particle beams on the chromospheric emission in the 20th and 25th July 2004 solar flares**

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We present the results of a multi-wavelength study of short-term variations of H-alpha and CaII K line emission in the 20th and 25th July 2004 solar flares. In both flares the fast changes of H-alpha and CaII K intensity observed from VTT correlated very closely (seconds) with the HXR emission observed by RHESSI that is considered as the signatures of energetic particle beams in the chromosphere. For interpretation of the observed emission the full non-LTE radiative simulations were carried out for a combination of radiative, thermal and non-thermal mechanisms of excitation and ionization of the hydrogen and Ca emission in flaring atmospheres. Various theoretical models are compared with the observational results in order to define the best fits and to clarify the processes of energy transport within a short timescale of seconds from upper to lower atmospheric levels in the solar flares.