

**Diagnostics of non-thermal processes in chromospheric flares:
II. H α and CaII K line profiles of an atmosphere bombarded
by hecta keV protons**

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Abstract

The effects on the H α and CaII K line profiles of non-thermal excitation and ionization of hydrogen and ionized calcium by a hecta keV proton beam have been investigated. Non-LTE H α and CaII K line profiles have been calculated for the temperature distributions of semi-empirical flares models F₁ and F₂ (Machado et al. 1980). For reasonable values of the beam energy flux and power index, the hydrogen lines are greatly strengthened. However, contrary to the case of an electron bombarded atmosphere, the lines are not broadened, and no central reversal appears. These effects, alone or in conjunction with linear polarization measurements or Ly α red wing observations, can be used to diagnose proton beam bombardment.