The Influence of Chemi-Ionization and Chemi-Recombination Processes on H lines in M dwarf Atmospheres

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INTRODUCTION

- influence of collisional chemi-ionization processes

$$H^*(n) + H => e + H_2^+ \qquad (1)$$
$$H^*(n) + H => e + H + H^+ \qquad (2)$$

- And the corresponding inverse recombination processes

$$e + H_2^+ => H^*(n) + H \qquad (3)$$
$$e + H + H^+ => H^*(n) + H \qquad (4)$$

was investigated in weakly ionized layers of Solar atmosphere and atmospheres of cool stars”

Efficiency compared with the relevant ionization and recombination processes

$$e + H^*(n) => e + H + H^+ \qquad (5)$$

$$e + e + H^+ => e + H^*(n) \qquad (6)$$

$$e + H^+ => \varepsilon_\lambda + H^*(n) \qquad (7)$$

- ε_λ denotes the energy of the emitted photon

Before $H^*(n)$ with $n > 3$, now with $n > 1$

general stellar atmosphere code PHOENIX

FIGURE 1. Structure of model atmosphere

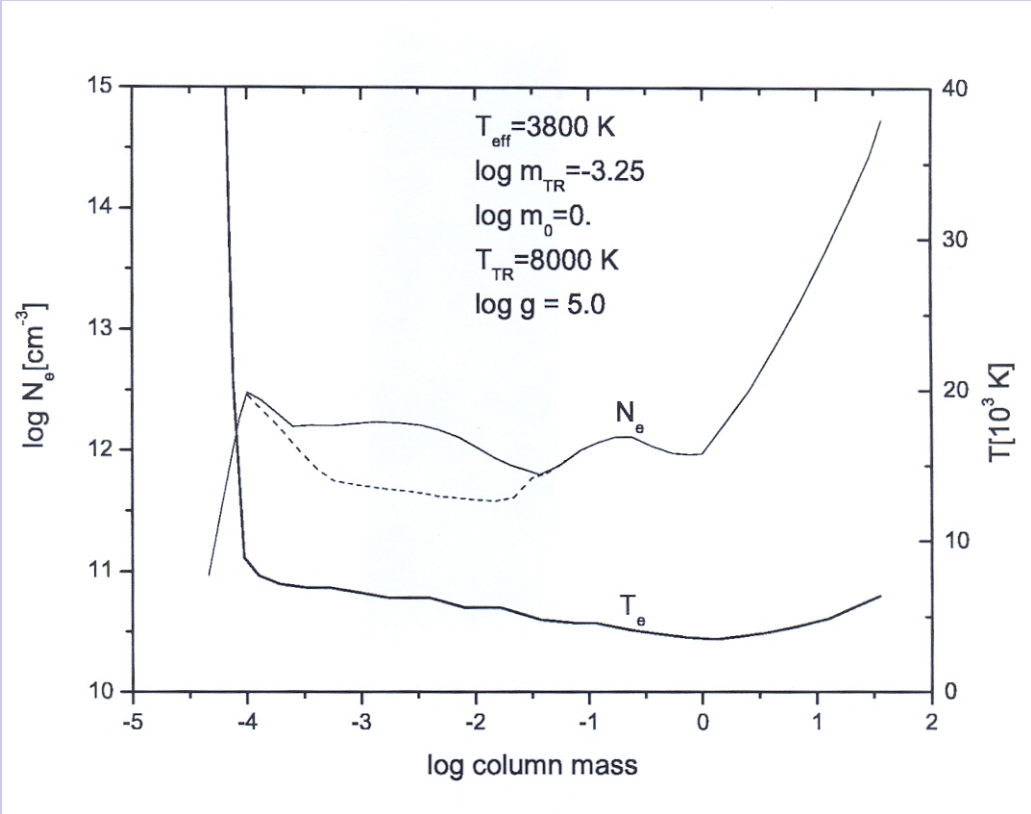


FIGURE 2. Line profiles with (full) and without (thin) inclusion of chemi-ionization and chemi recombination processes for H_α

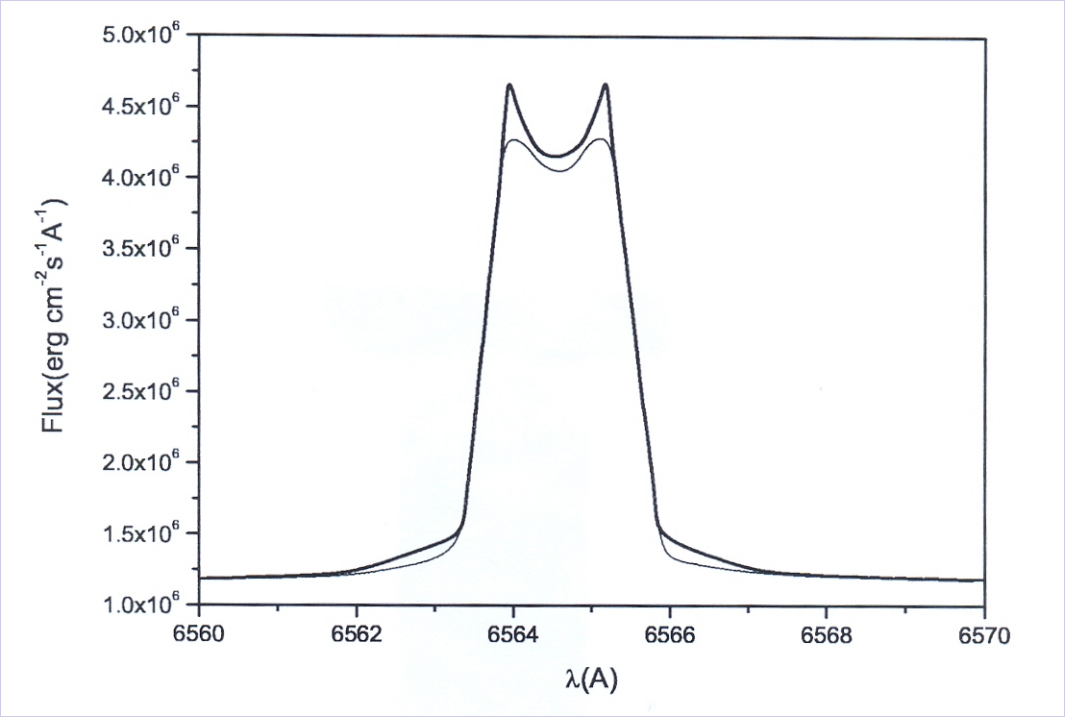


FIGURE 3. As in Fig.2 but for H_δ line

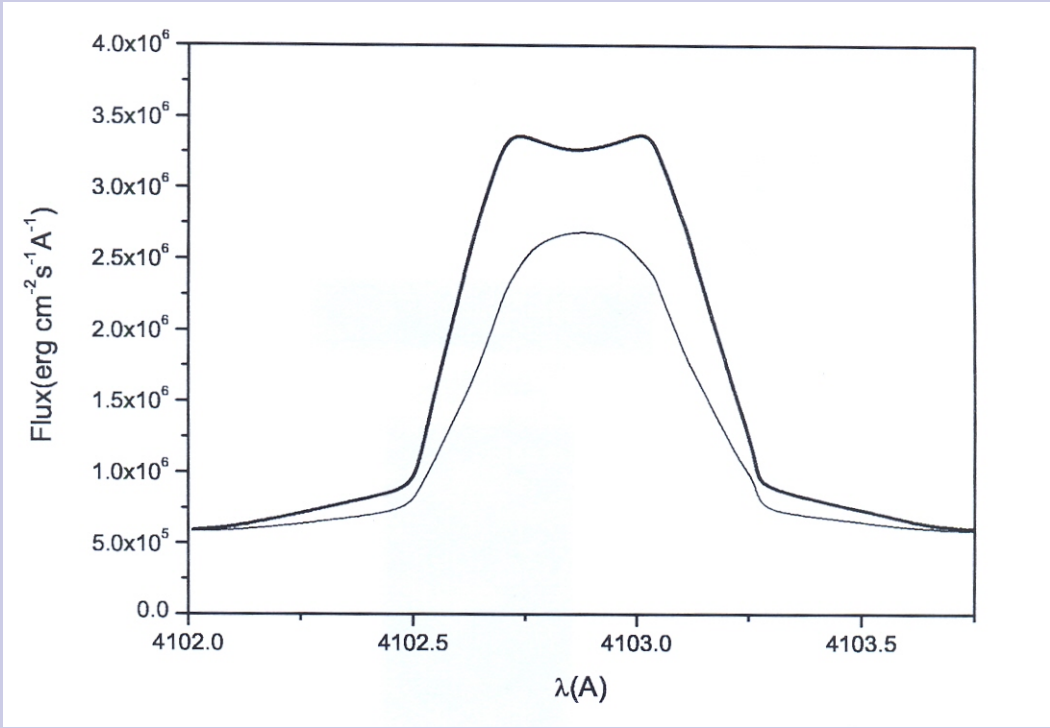


FIGURE 4. As in Fig.2 but for H_{ε} line

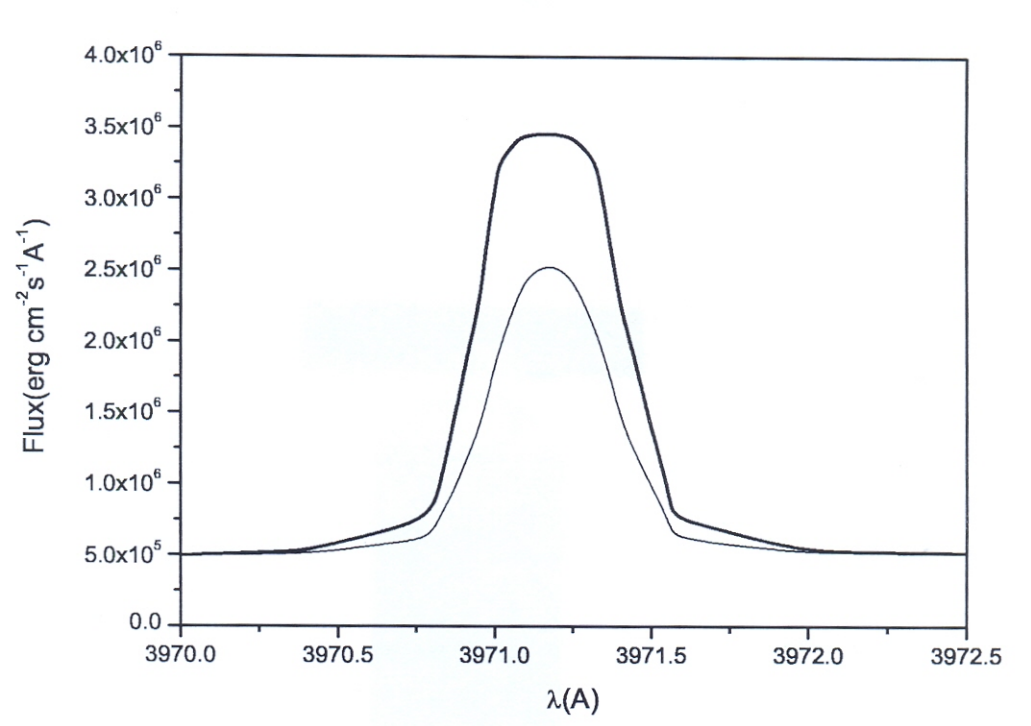
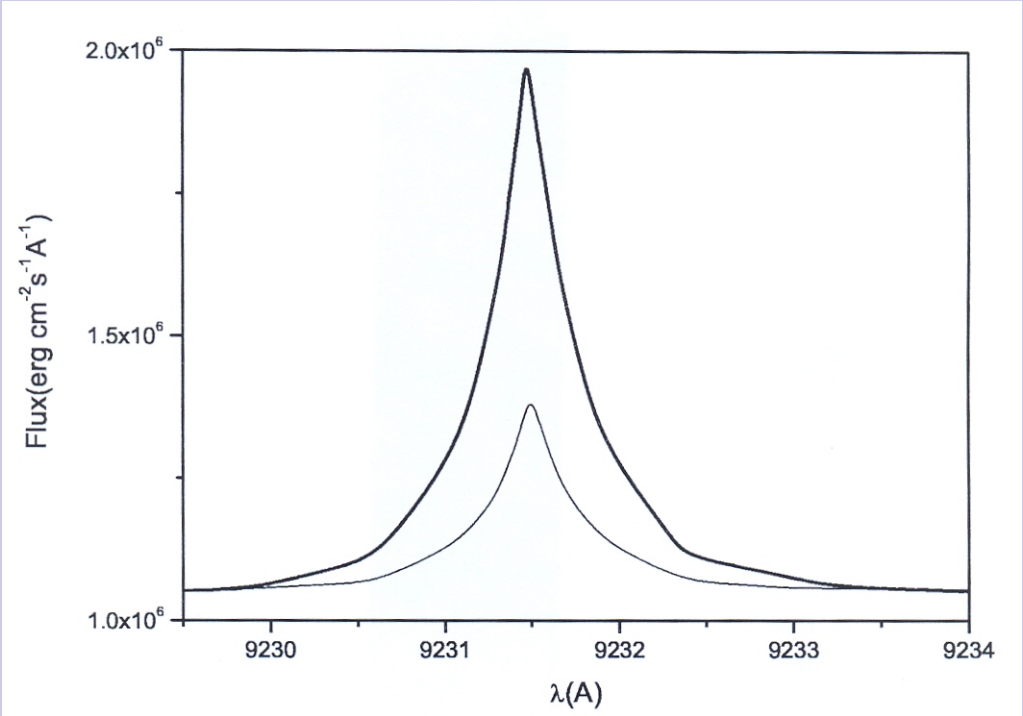


FIGURE 5. As in Fig.2 but for Pa_{ε} line



Thank you!