The CaII triplet in Quasars: from the accretion disk to the star formation

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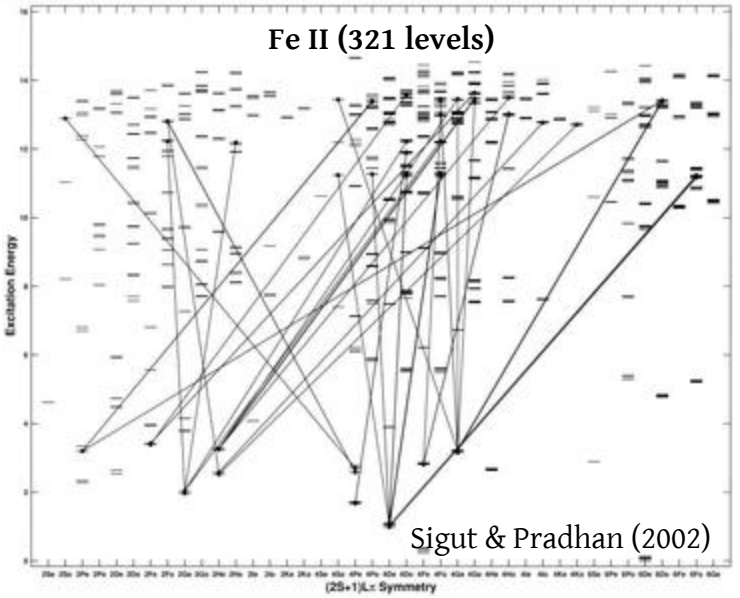
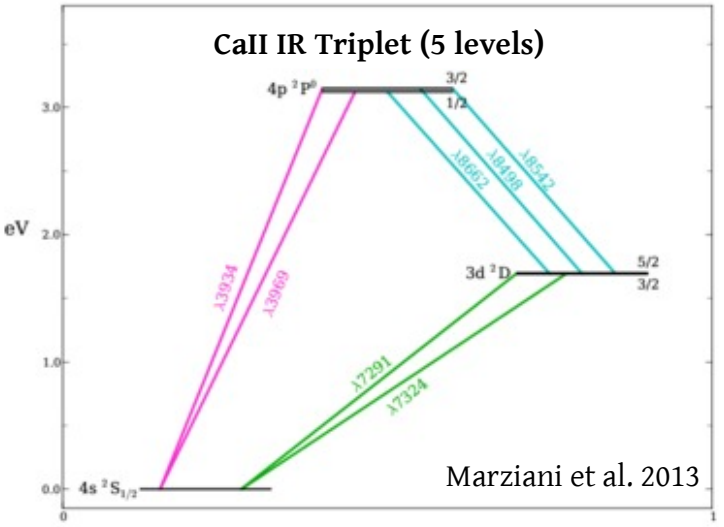
FeII problem: the CaII IR triplet as an alternative

Ion	T (°K)	n_H (cm^{-3})	N_H (cm^{-2})
Hβ	10^4	10^9	10^{23}
C IV	$>10^4$	10^9	10^{21-23}
Fe II	~8000	$>10^{11}$	10^{23-25}

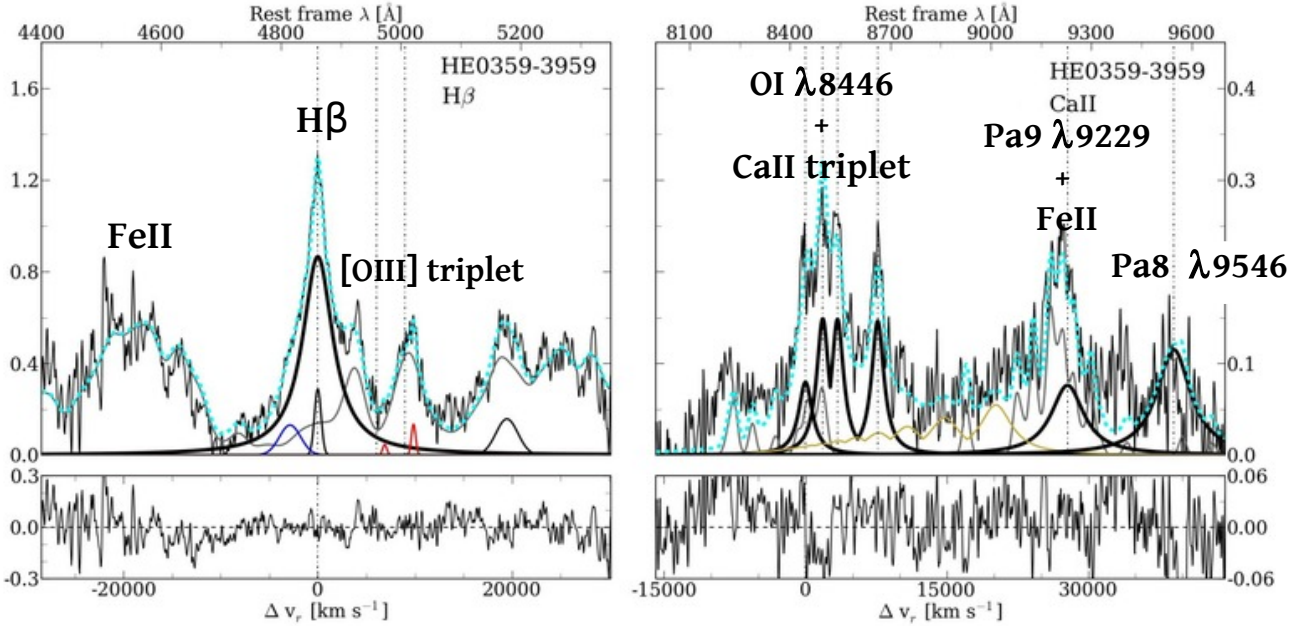
+ dynamics = Hβ -> Clouds
C IV -> Clouds and winds
Fe II -> Outer part of the accretion disk



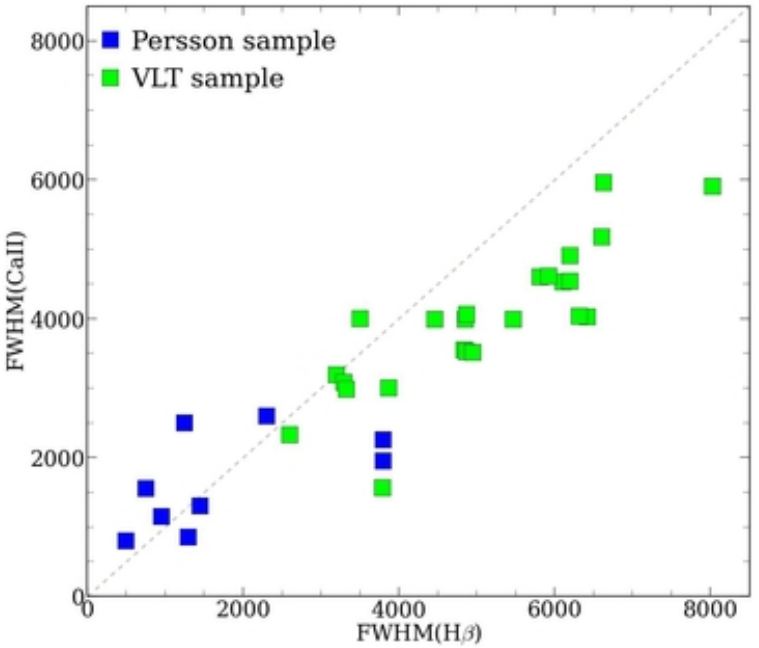


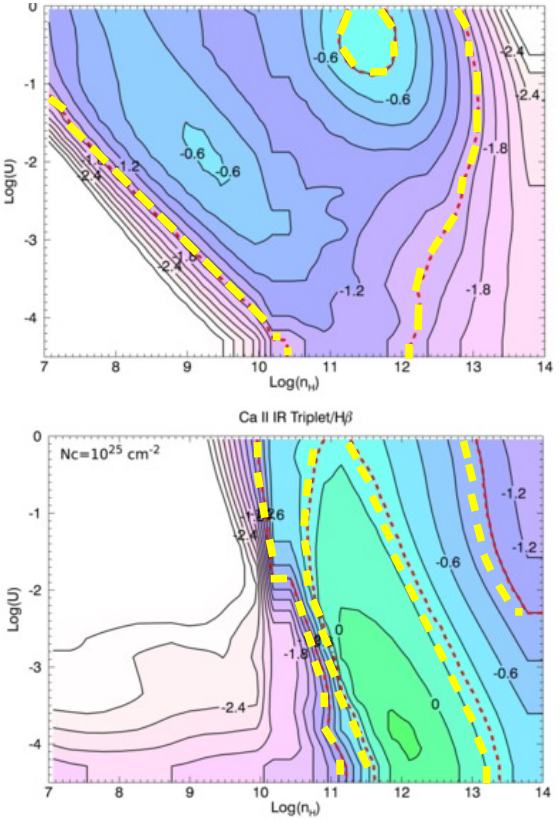
IR spectroscopic survey of quasars (Martínez-Aldama et al. 2015)

- 25 quasar
- $-26 \geq M_V \geq -29$
- $0.85 \leq z \leq 1.68$



Hβ is emitted by a closer region of central source than the CaII ion





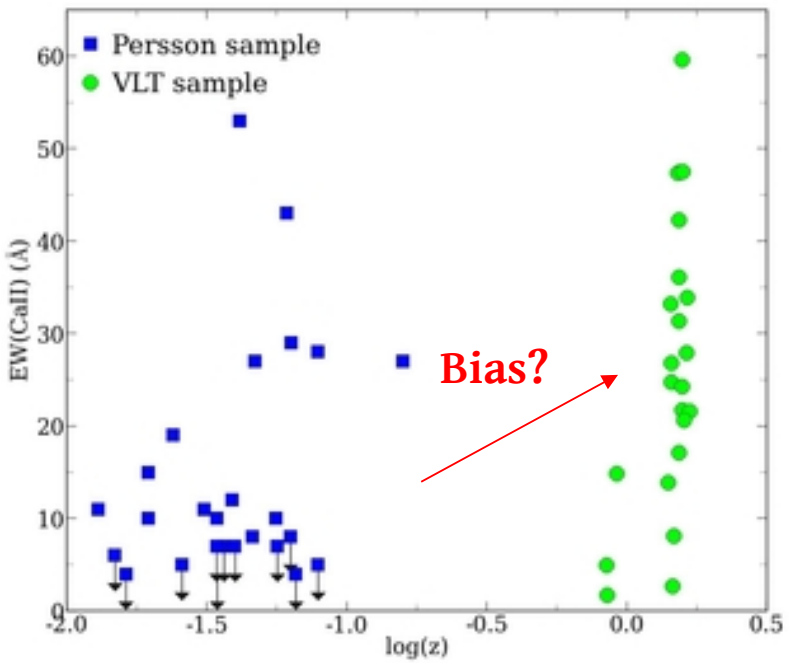
According to the photoionization codes the CaII is emitted in a region with the next physical conditions:

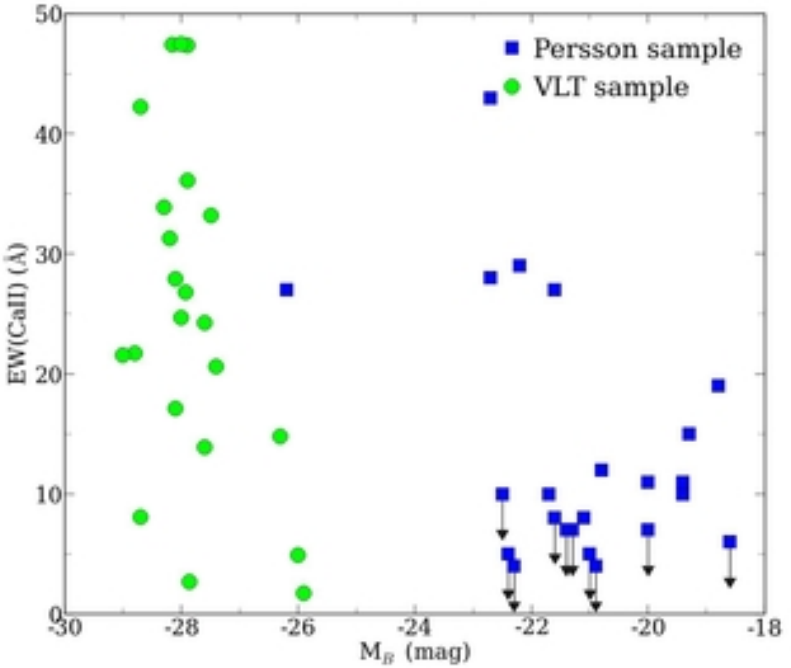
$N_c = 10^{25}$ cm^{-2}

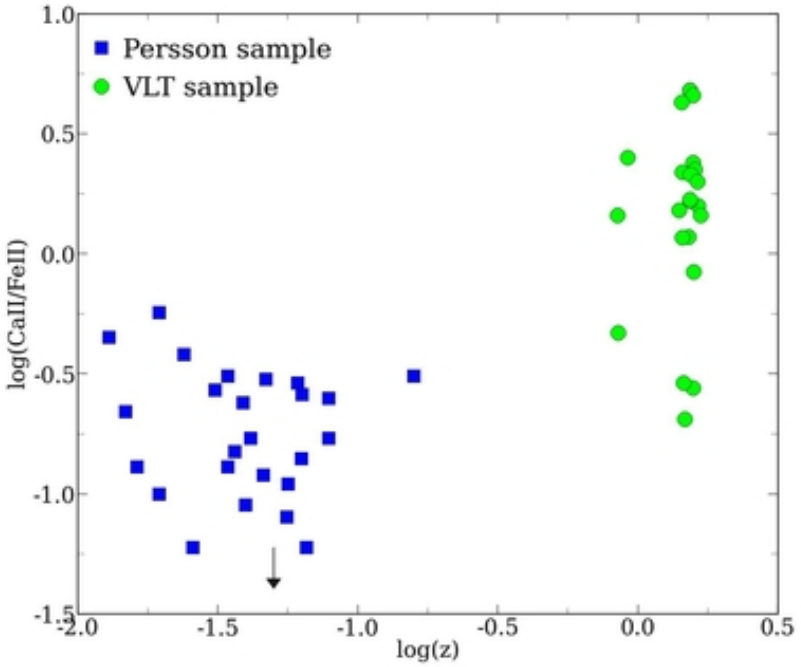
$n_H > 10^{11}$ cm^{-3}

log(U)~-1.0

CaII behavior at low and high redshift: a hint for a recent star formation?







$$\left(\frac{\text{CaII}}{\text{FeII}}\right)_{\text{high-z}} > \left(\frac{\text{CaII}}{\text{FeII}}\right)_{\text{low-z}}$$

SN Ia → FeII t~10^9 years

SN II → CaII t~10^7 years

CaII belongs to the α-elements, which are considered like chemical indicators, therefore [CaII/FeII] could be an indicator of a recent burst of star formation