

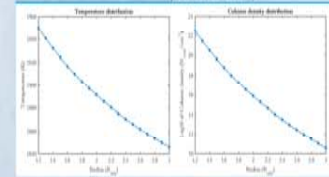
SYNOPTIC DIAGRAM OF PAMPERO

Stellar CLV

MOLsphere CLV

MARCS spherical model (Gustafsson et al. 2008)
 ($T_{\text{eff}}, \log g, M_{\star}, v_{\text{micro}}, [\text{Fe}/\text{H}], \text{CN-cycled composition}$)

+
 Turbospectrum (Alvarez & Plez 1998, Plez 2012)
 (Molecular lines, Edlén's formula + air attenuation correction)
 (Edlén 1966)



Optical depth & Intensity (Gustafsson et al. 2008)

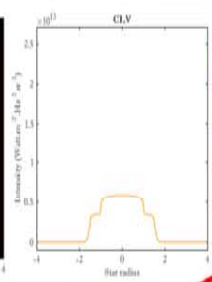
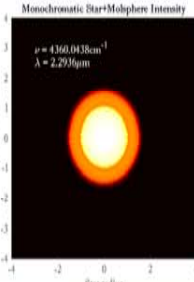
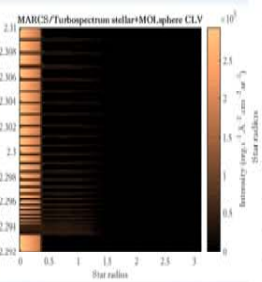
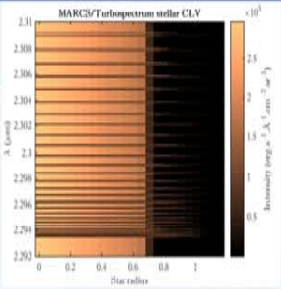
$$\tau_{\text{mol}} = \sum_r / R_{\star} N_{\text{mol}} \sigma_{\text{eff}} \frac{qf}{Q(T_{\text{mol}})} [1 - \exp(-\frac{hc}{\lambda k_{\text{B}} T_{\text{mol}}})]$$

$$I_{\text{marcs}} = I_{\star} = \int S_{\lambda}(\tau_{\star}) \exp(-\tau_{\star}) d\tau_{\star}$$

$$I(\mu, \lambda, T_{\text{mol}}, N_{\text{mol}}) = \begin{cases} I_{\star} \exp[-\mu\tau_{\text{mol}}] + I_{\text{mol}}(1 - \exp[-\mu\tau_{\text{mol}}]) & \text{if } \mu \leq \mu_{\star} \\ I_{\text{mol}}(1 - \exp[-2\mu\tau_{\text{mol}}]) & \text{if } \mu > \mu_{\star} \end{cases}$$

Where $\mu_{\star} = \sqrt{1 - (R_{\star}/R_{\text{mol}})^2}$ (e.g., Montargès et al. 2014)

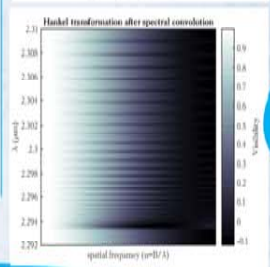
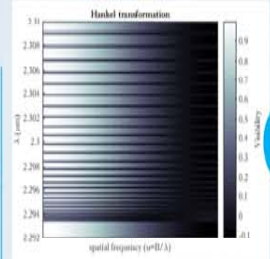
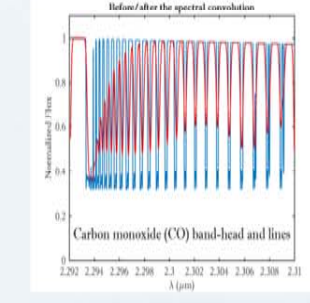
An example in the near-infrared (K-band)



Flux spectral convolution

$$F(\lambda) = 2\pi \int_0^1 I_{\text{marcs+mol}}(\mu, \lambda, T_{\text{mol}}, N_{\text{mol}}) \mu d\mu$$

(e.g., Ohnaka 2013)



Hankel's transformation

$$V_{\text{Hankel}} = \frac{\int_0^{R_{\text{mol}}} I_{\star+\text{mol}} J_0(\pi B \mathcal{D}_{\star} r / \lambda) r dr}{\int_0^1 I_{\star+\text{mol}} r dr}$$

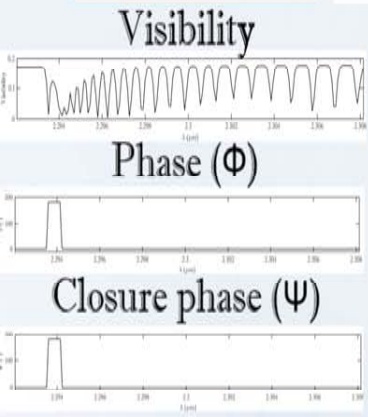
(e.g., Montargès et al. 2014)

Visibility spectral convolution

$$V_{\text{conv}} = \text{Conv}(V_{\text{Hankel}})$$

Interpolation on baselines (B)

$$V_{\text{end}} = \text{Interp}(V_{\text{conv}}(\mathcal{O}_{\star}, \mathcal{O}_{\text{mol}}, B, R_{\text{max}}))$$



Interpolations on observed wavelength (λ)