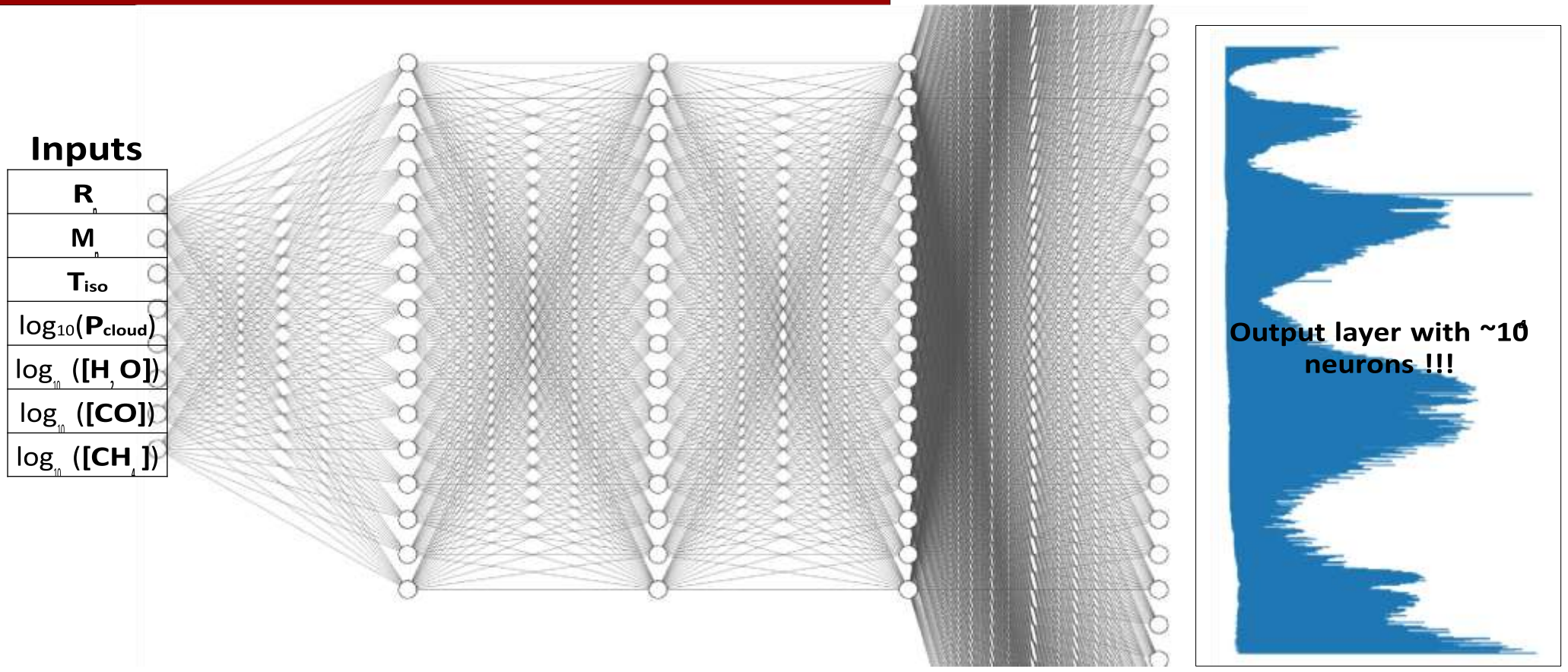
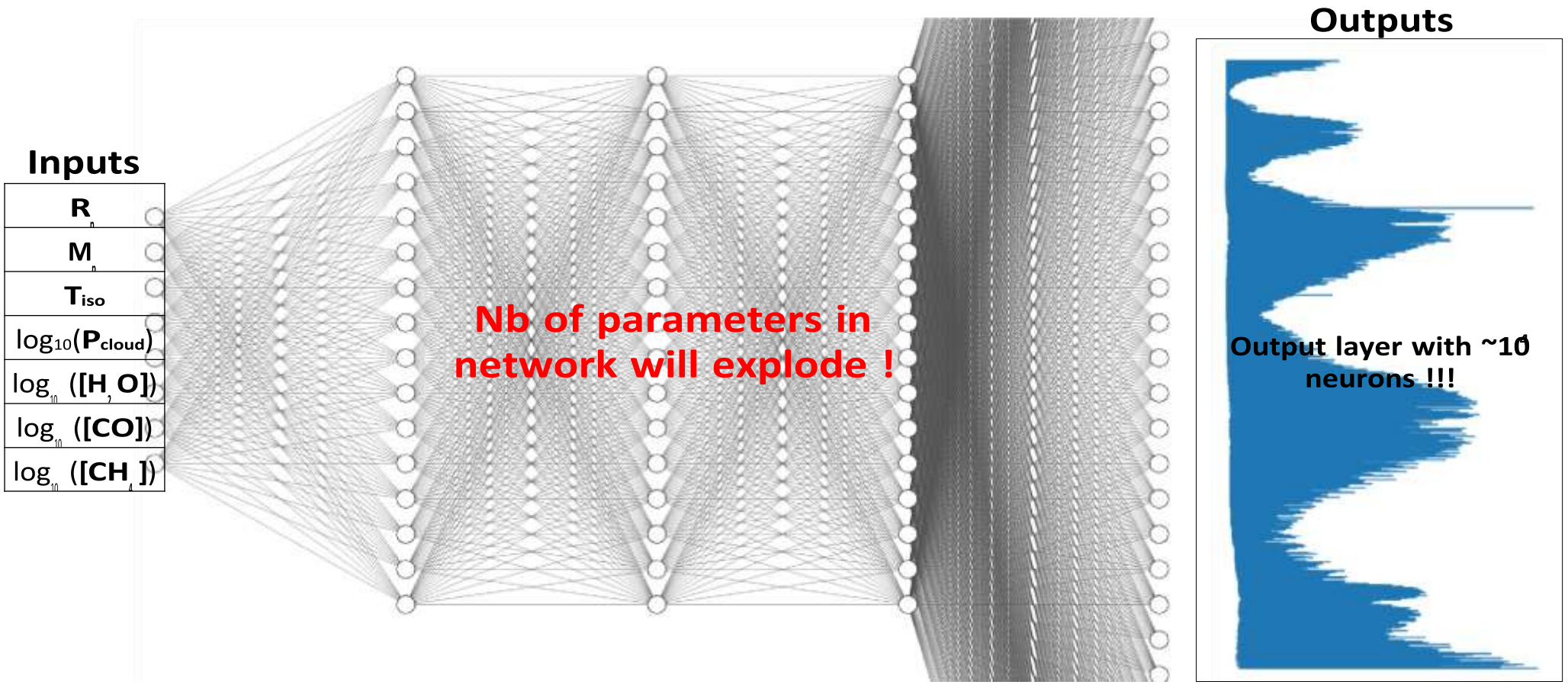
# Defining the network structure



# Defining the network structure

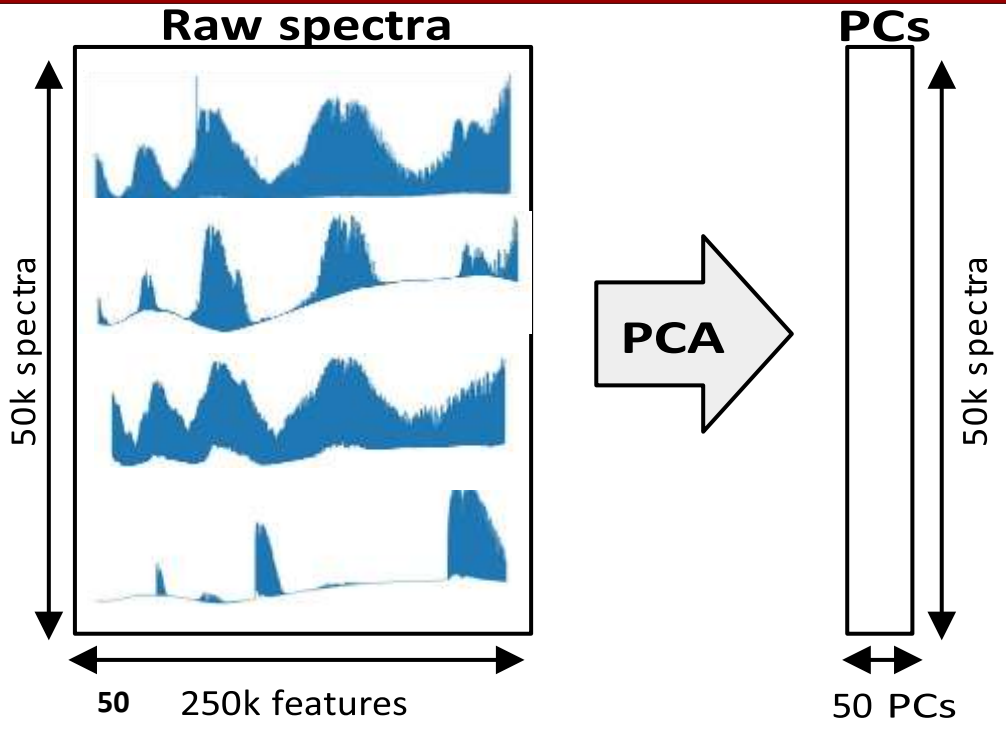
Naïve approach : train it to directly predict high-resolution spectra...

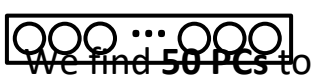
# Defining the network structure



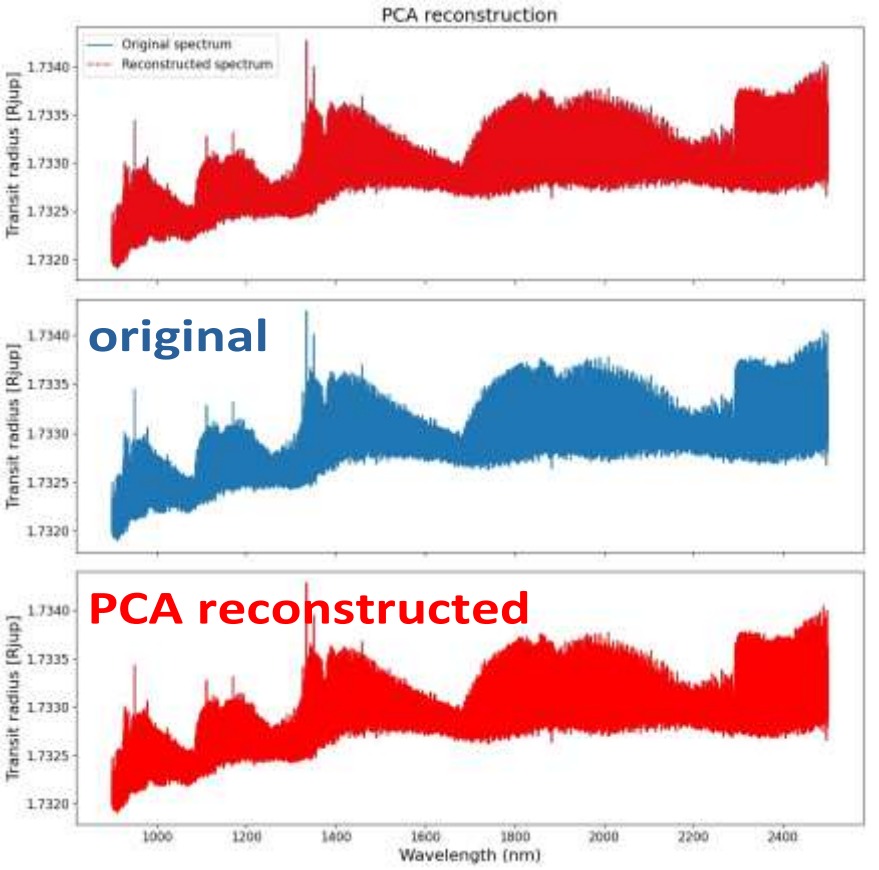
Encode high-resolution spectra with a few **Principal Components** (**PCs**) :

# Testing model 40 architectures




We find **~~50 PCs~~** to be enough for **'Easy mode'**



# Testing model architectures



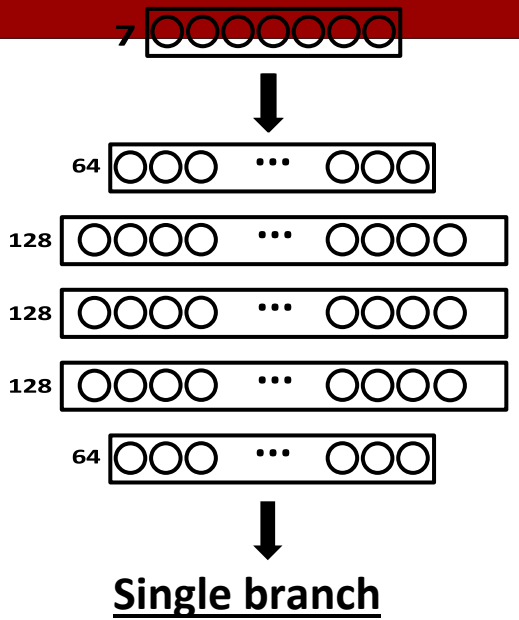
## Single branch

( Rp, Mp, $T_{iso}$, $P_{cloud}$, [H2O], [CO], [$CH_4$] )

50

PCs

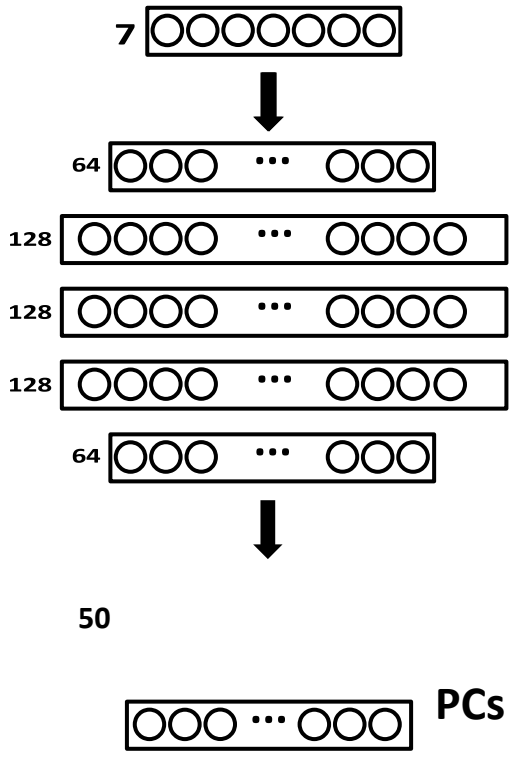
# Testing model 42architectures

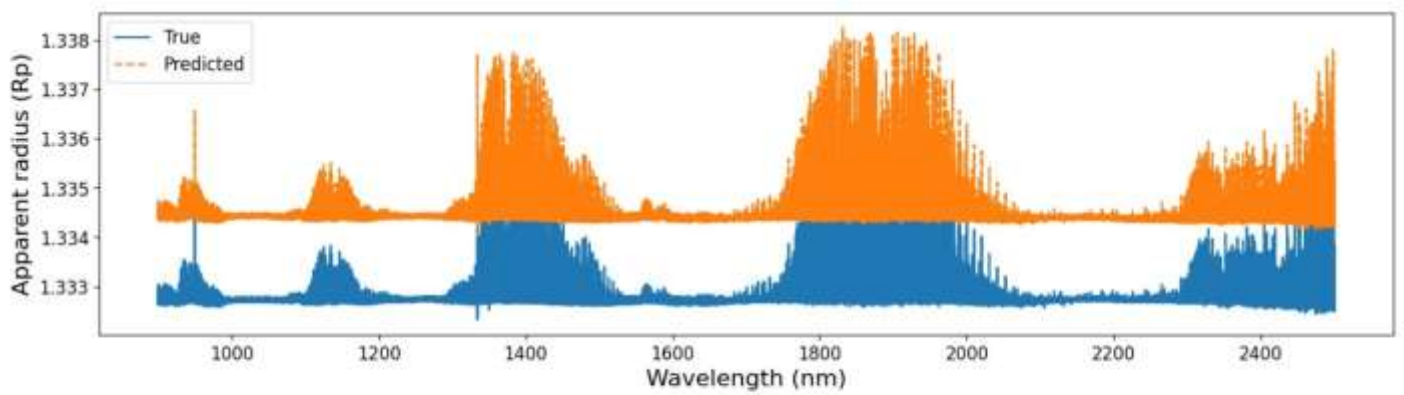


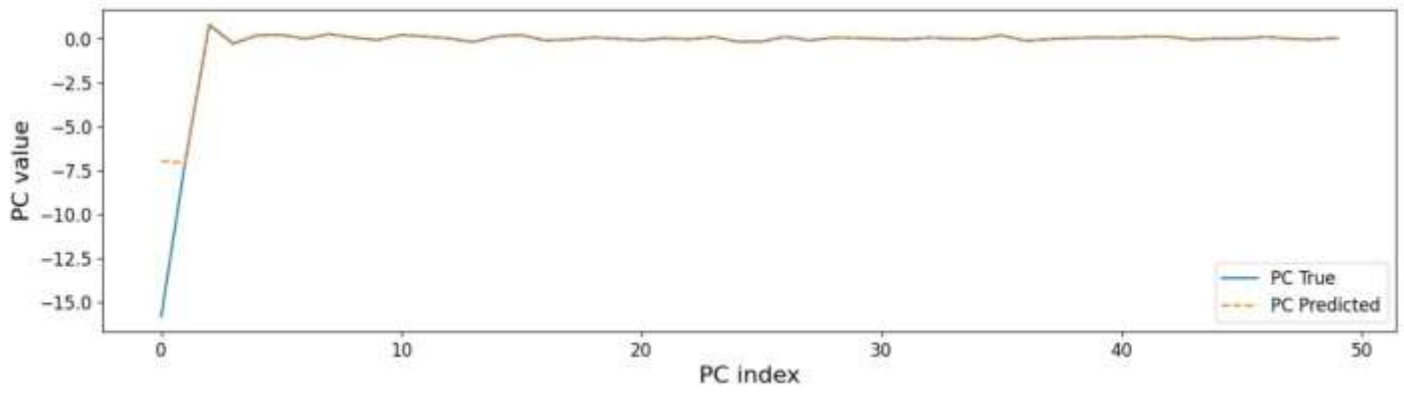
# Testing model



( Rp, Mp, $T_{so}$, $P_{cloud}$, [H2O], [CO], [$CH_4$] )

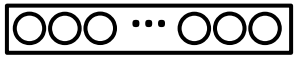


# Testing model architectures

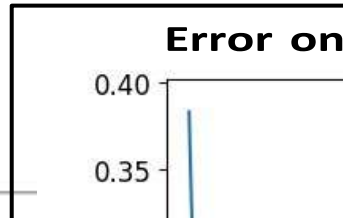




50

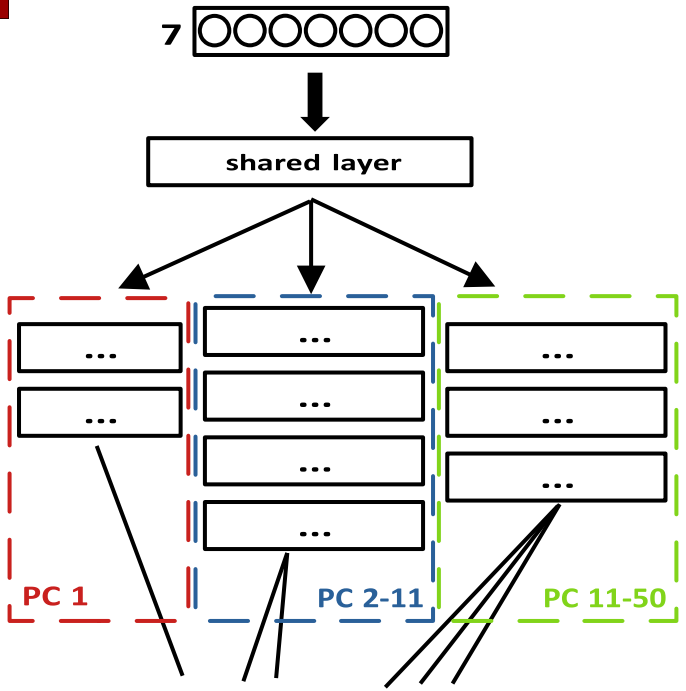
PCs

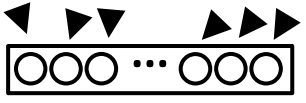
**Single branch**



# Testing model architectures

**Three branches**



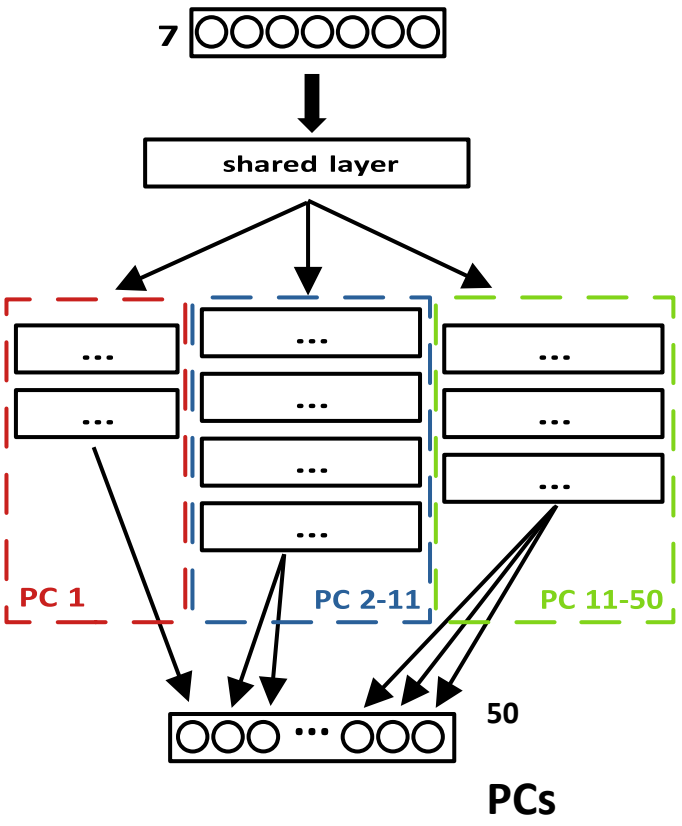



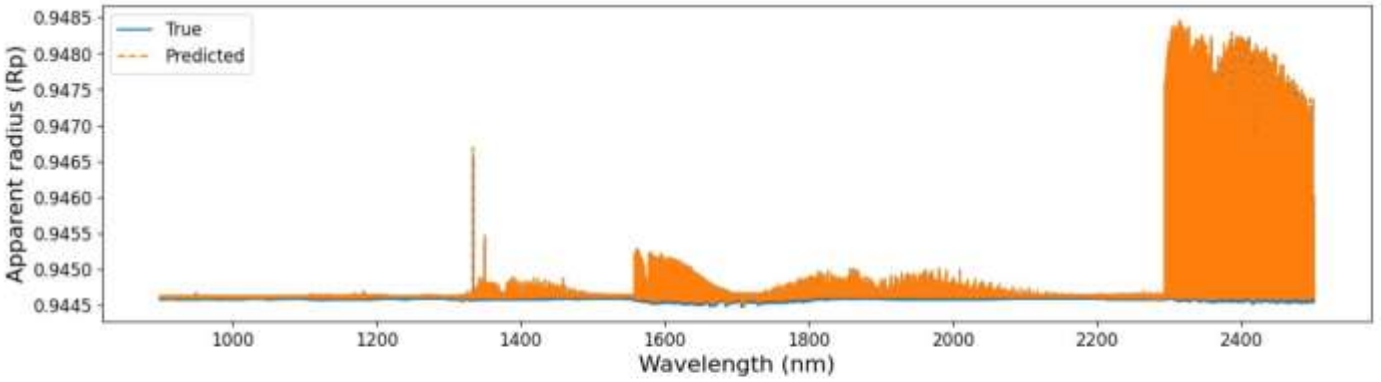
50

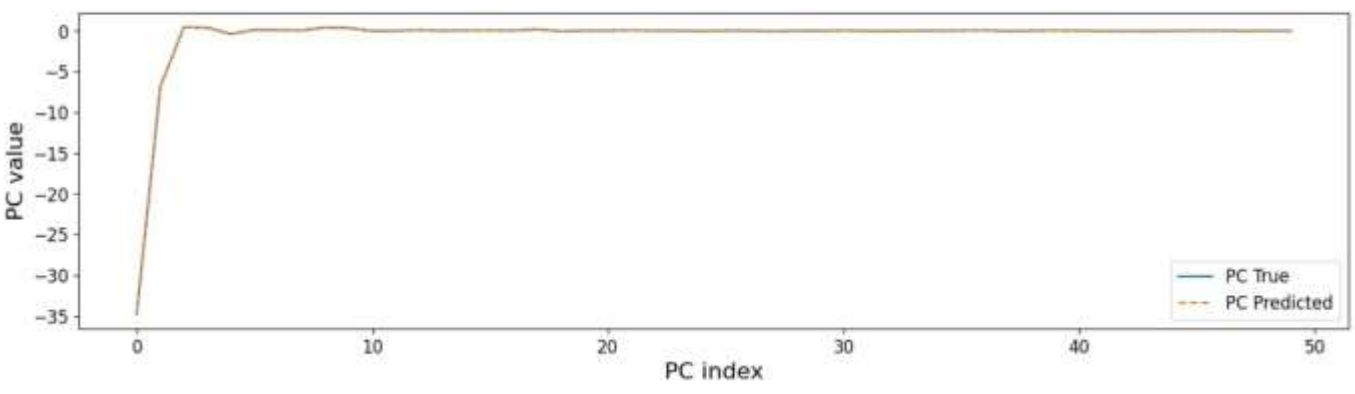
PCs

# Testing model architectures

**Three branches**

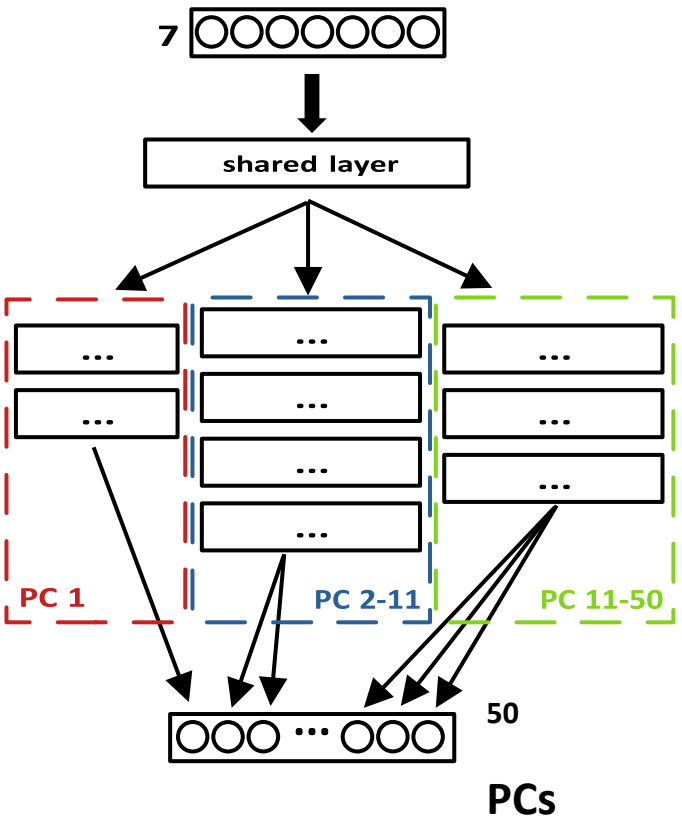


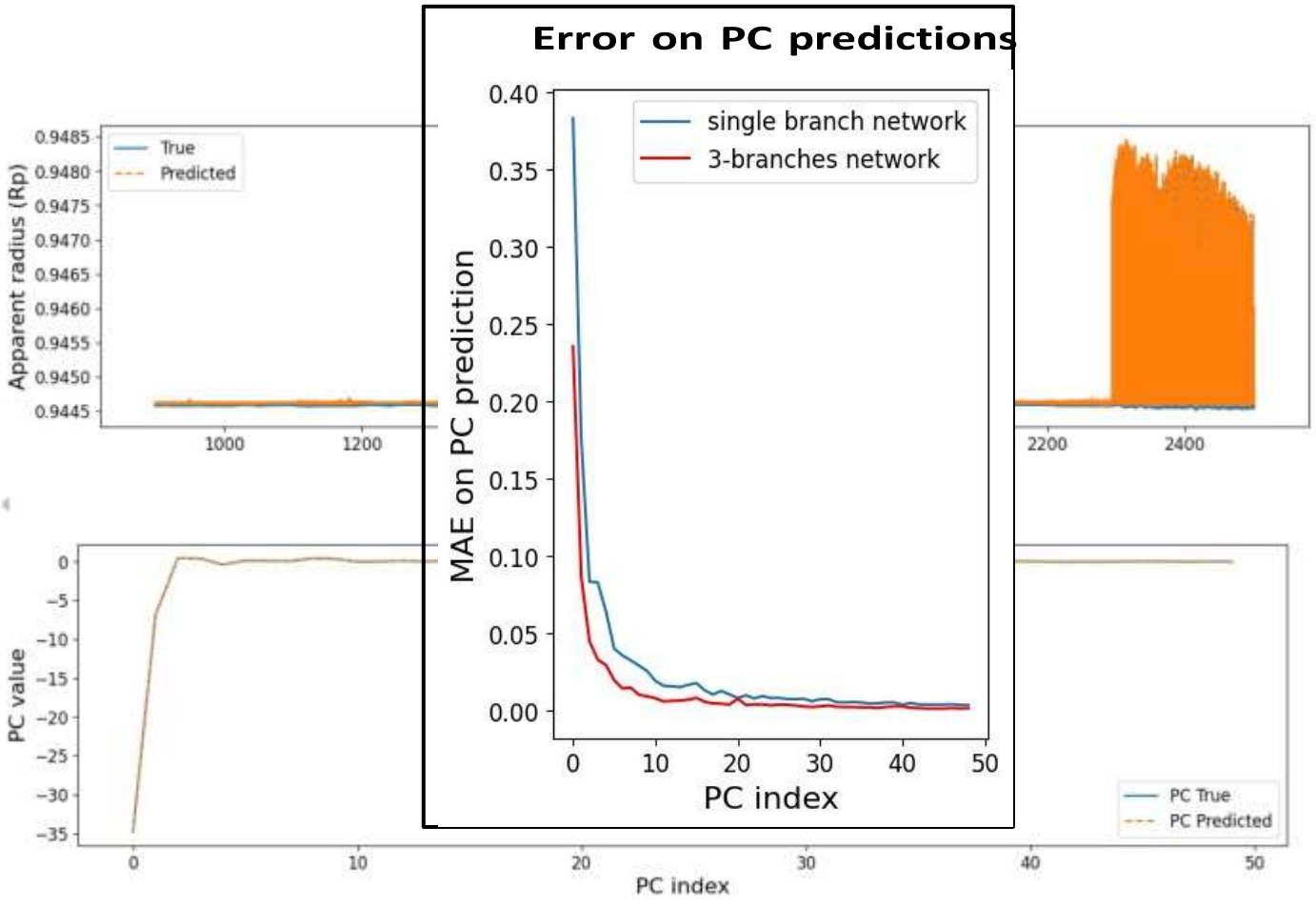



# Testing model architectures

## Three branches

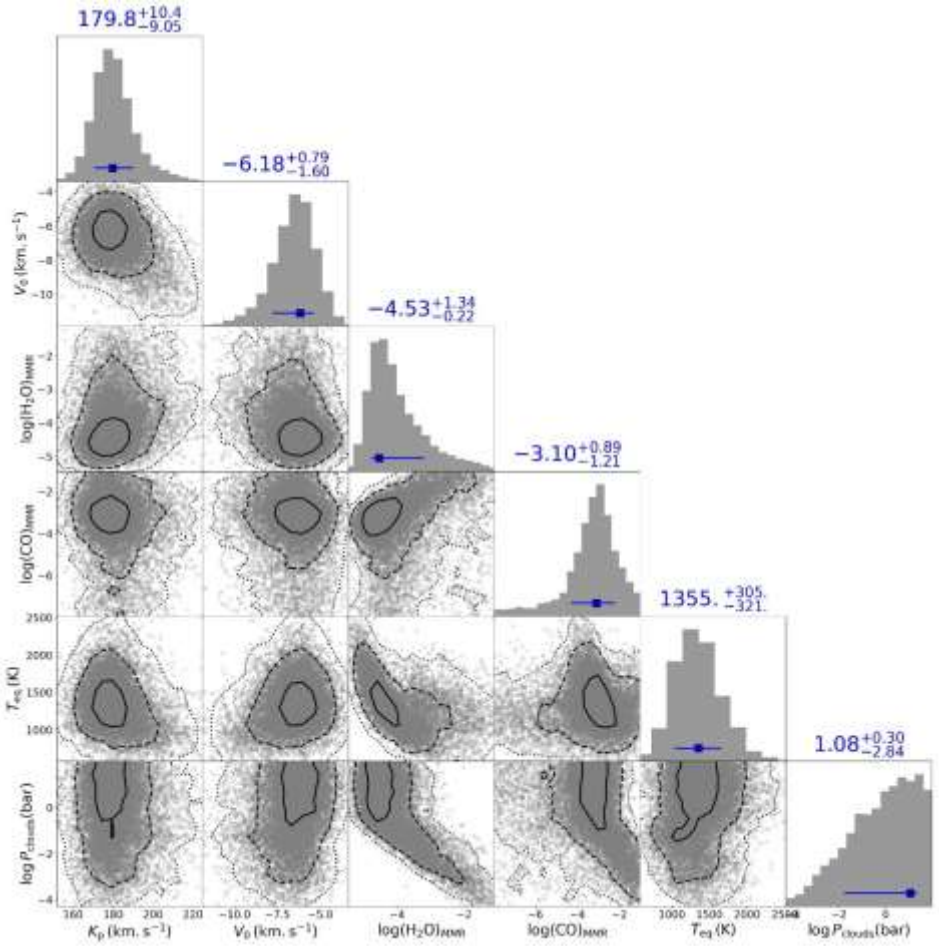


# Test case : WASP-76 b

Posteriors from Hood et al. 2025

# Test case : WASP-76 b

# Test case : WASP-76 b

- Multiple **strong $H_2O$** & **CO** detections

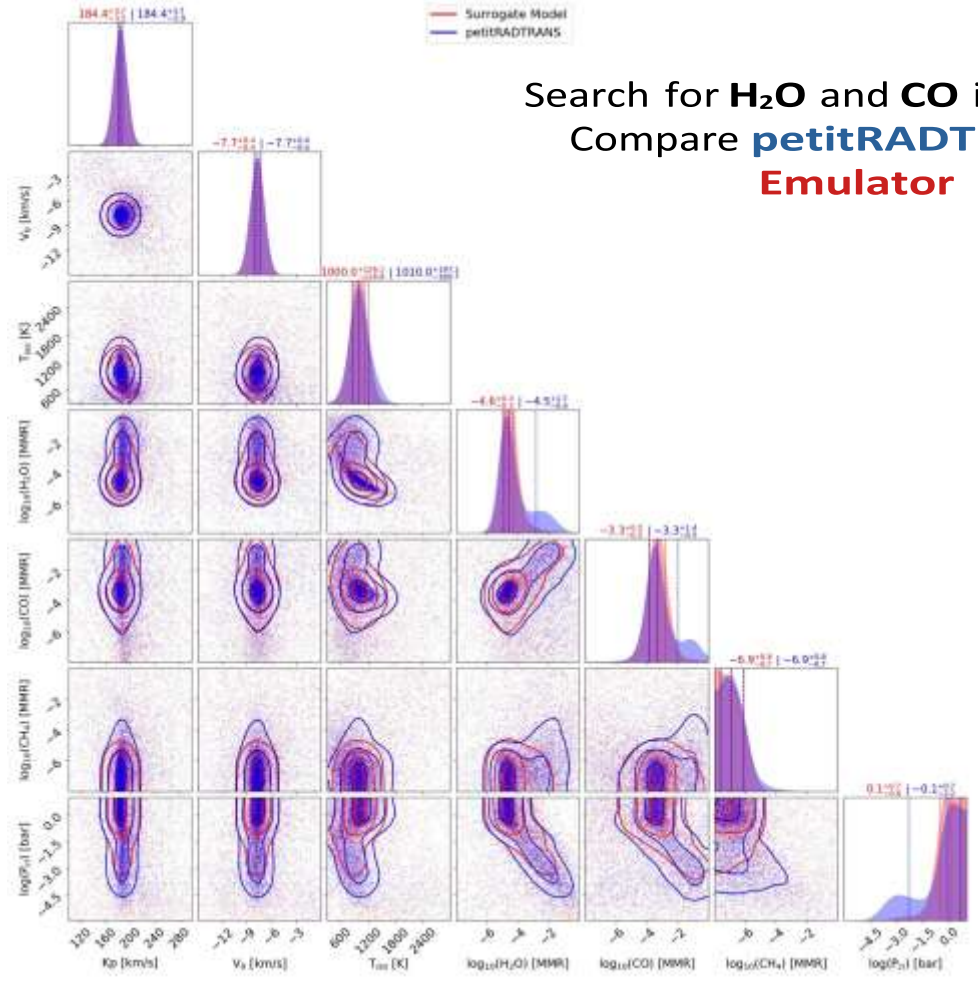
→ *Tsiaras+18, Fisher+18, vonEssen+20 Edwards+20, Fu+21, Hood+25, Masson+26*

- **3 transits** observed with SPIRou (R ~ 70 000)

→ 1 analyzed in Hood et al. 2025

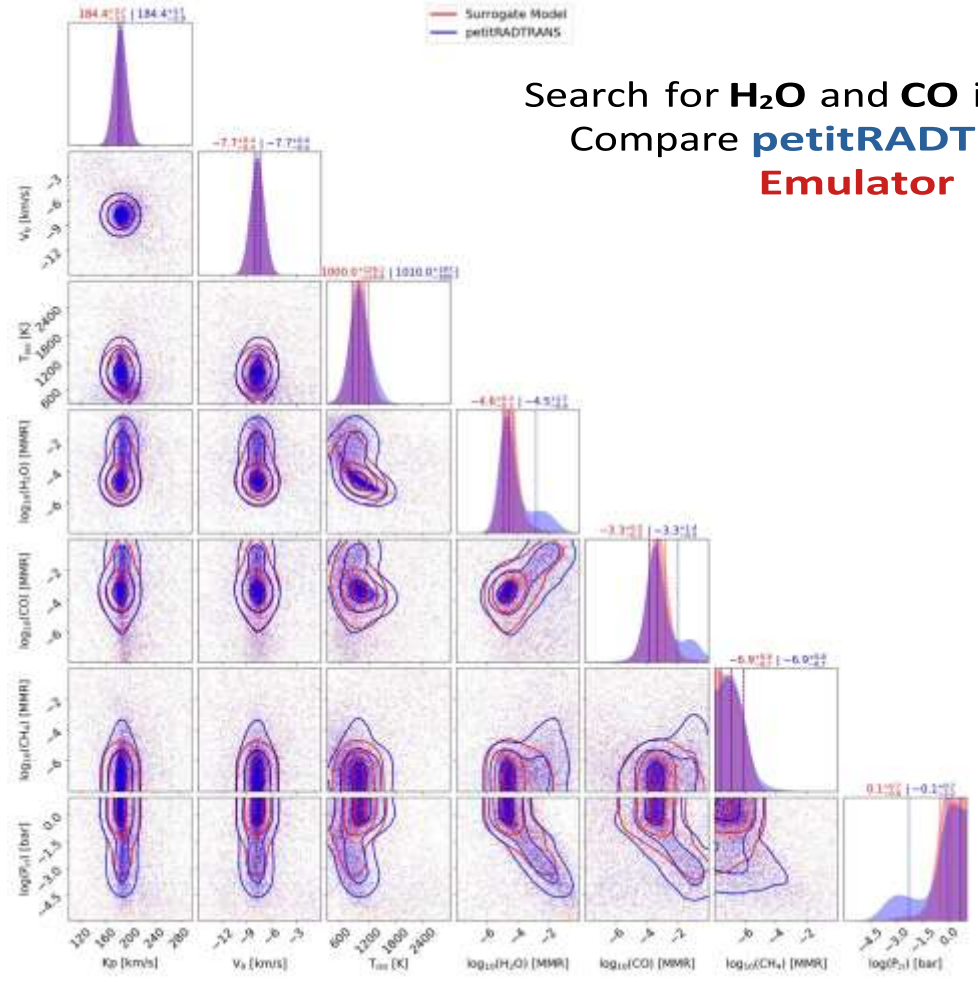
→ 3 analyzed in Masson et al 2026 (submitted)

# Test case : WASP-76 b




Search for **$H_2O$** and **CO** in WASP-76
Compare **petitRADTRANS**Vs
**Emulator**

# Test case : WASP-76 b




Search for $H_2O$ and CO in WASP-76
Compare petitRADTRANSVs
Emulator

Posteriors from Hood et al. 2025 (same data)