

Radial Velocity Precision of CHORUS with Different Pupil Slicing Designs



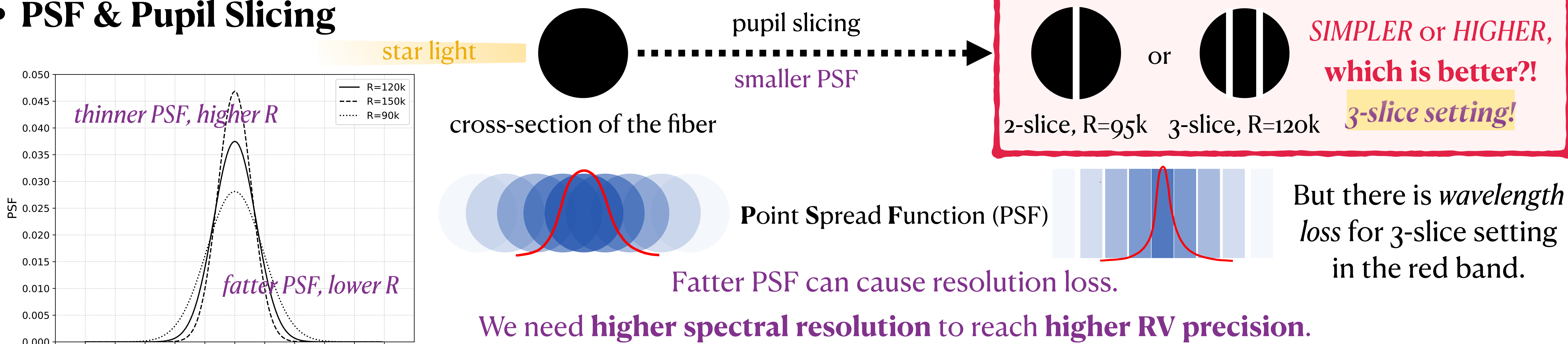
Chenyang Ji (季辰阳)¹, Sharon Xuesong Wang¹, Kai Zhang², Liang Wang²
¹Department of Astronomy, Tsinghua University; ²Nanjing Institute of Astronomical Optics & Technology, CAS
 Mail: jicy23@mails.tsinghua.edu.cn



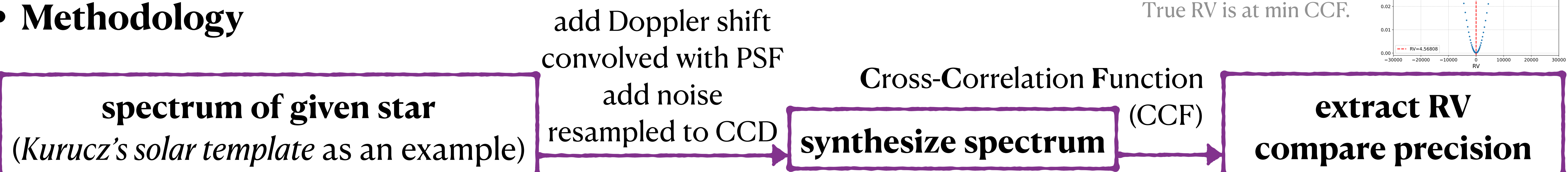
Canarian Hybrid Optical high-Resolution Ultra- stable Spectrograph (CHORUS) is a high-resolution spectrograph developed under Chinese and Spanish astronomical cooperation, and will be installed on the **Gran Telescopio de Canarias (GTC)** in 2027.

Aim to reach RV precision of $<0.3 \text{ m/s}$, with $R>100k$ in the visible band (400nm - 780nm).

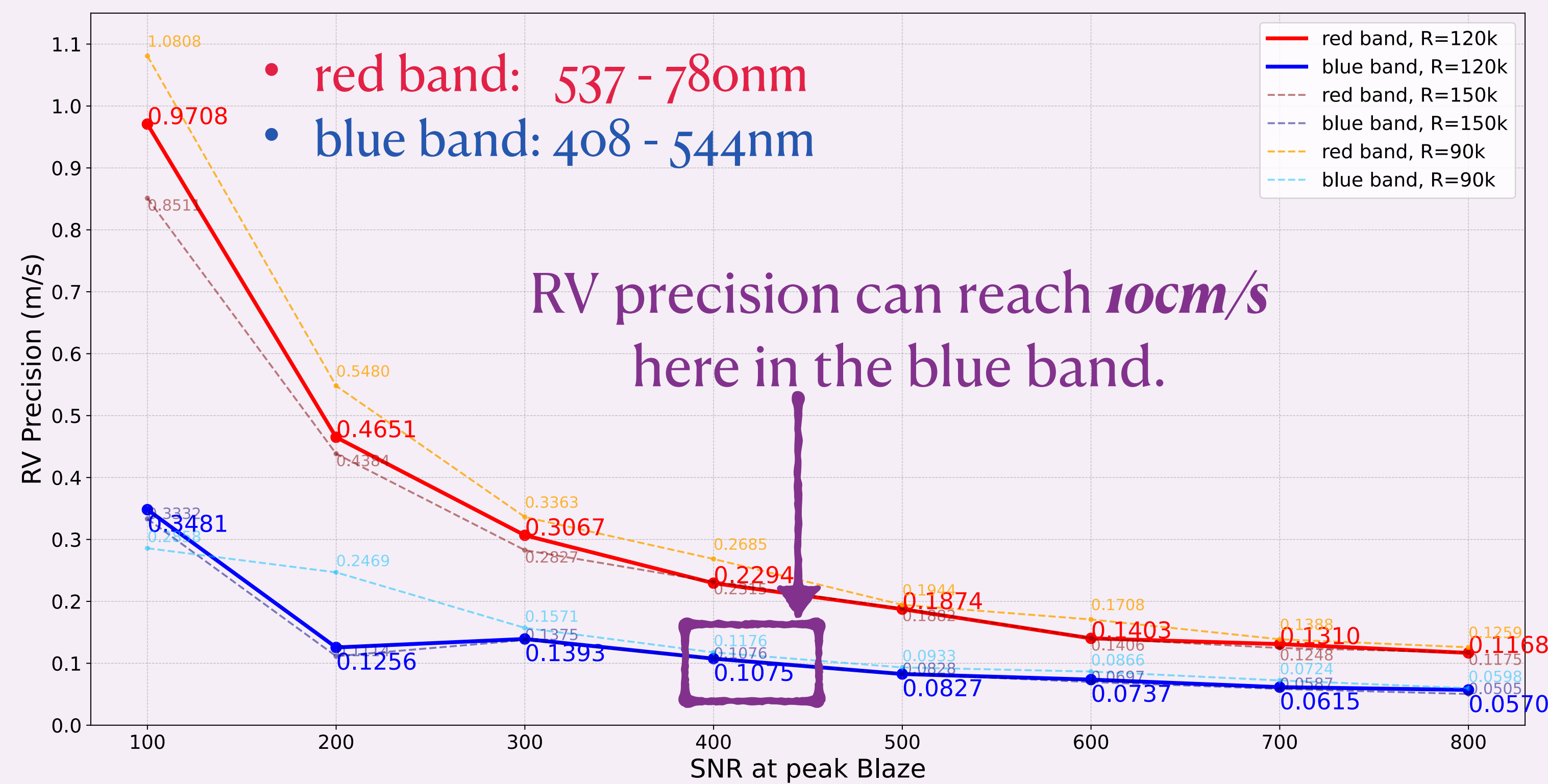
PSF & Pupil Slicing



Methodology



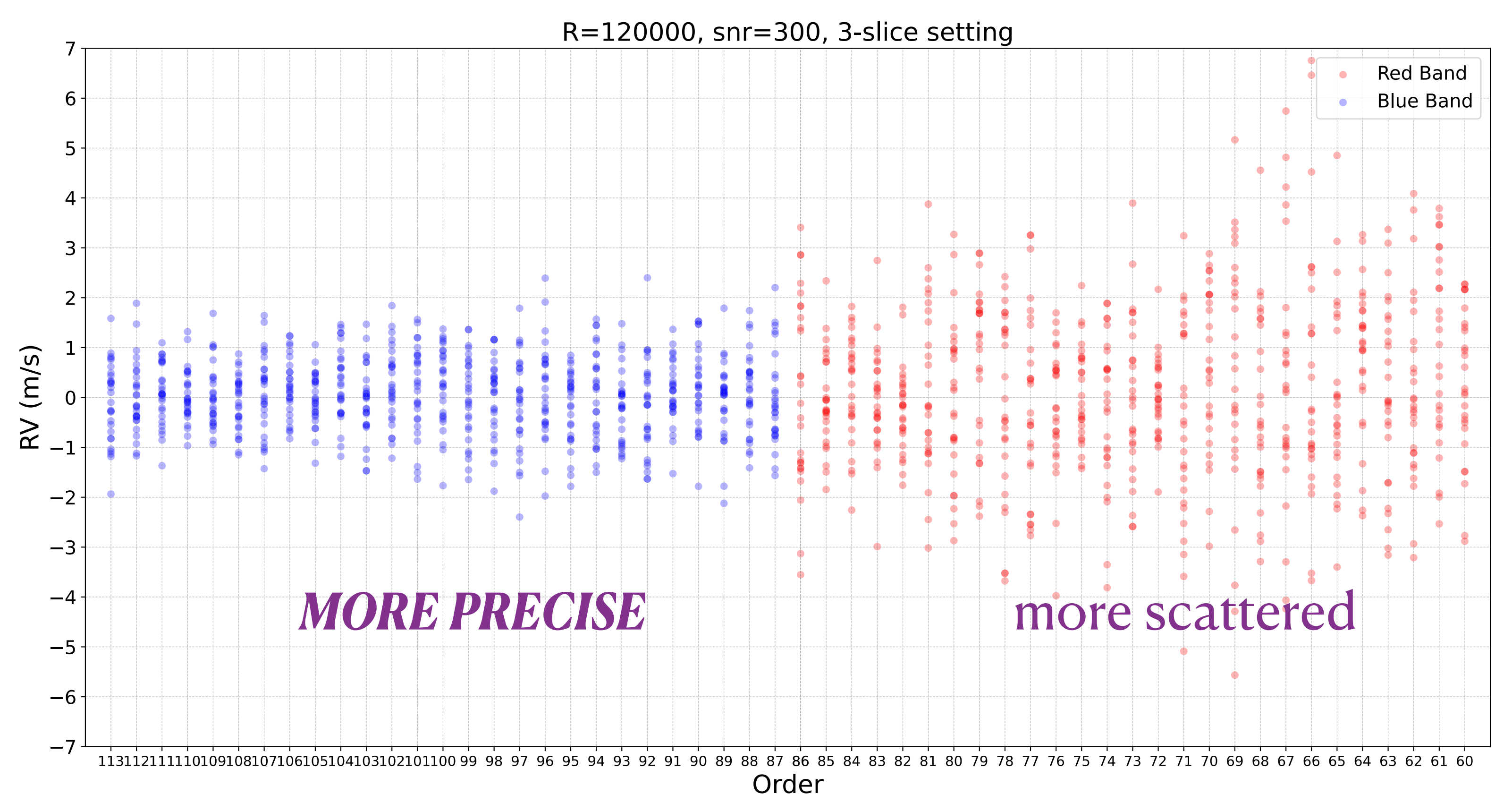
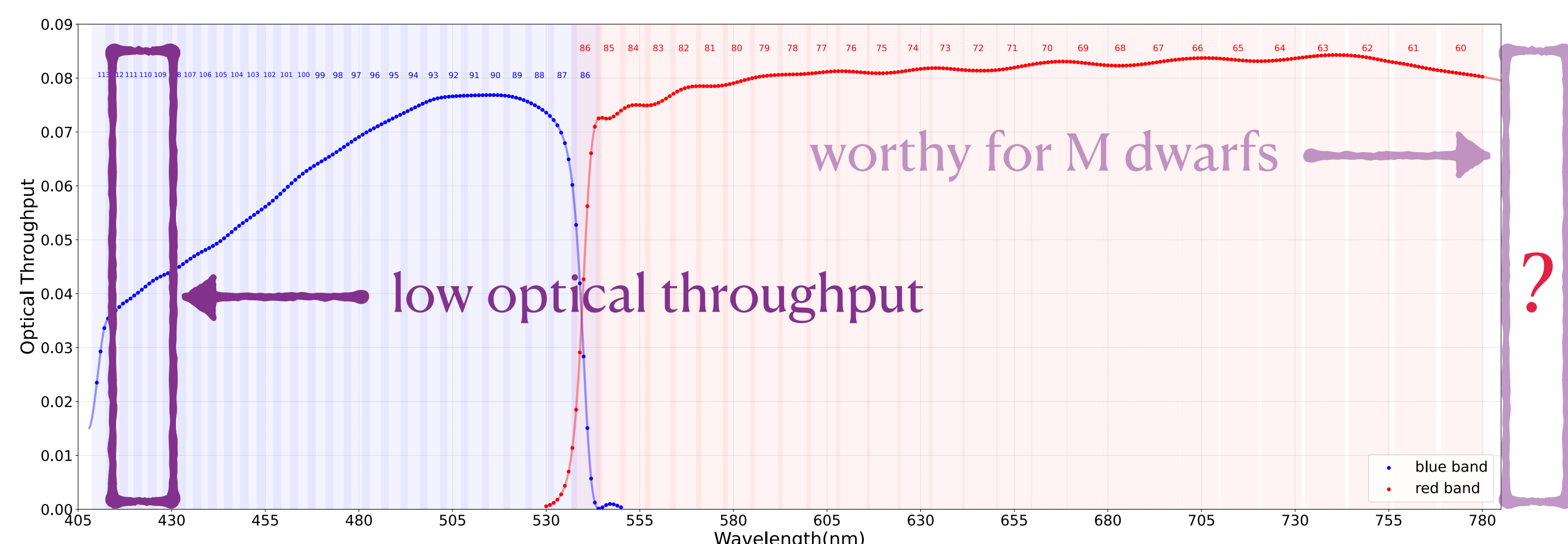
RESULTS: As SNR rising, what extend can RV precision reach for 3-slice setting?



- Precision in the blue band higher** than that in the red band: more absorption lines in blue for the Sun
- Choosing R=120k is the most economic for 3-slice setting.** Better than R=90k, and comparable to R=150k.
- We expect to reach **RV precision of lower than 10cm/s** at an achievable SNR for bright stars.

Ongoing Works

Can we remove some blue orders to have **more wavelength coverage in the red band**?



- RV precision in the red band** needs further estimation.
- This simulation is based on **the Sun (G dwarf)**. What is the case for other stellar types, like **M dwarf**?
- Compared with ESPRESSO**, what RV precision is expected to reach under this design?

Scan for appendix:

