

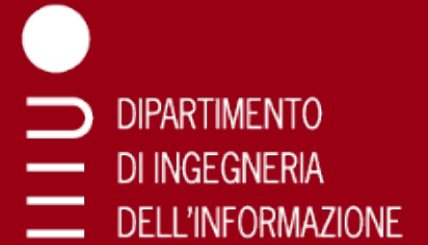
# PROJECT RECAP

- Settings and PRN reading (Davide)
- Binary file reading (Mattia)
- Downconversion and filter (Gabriele)
- Signal acquisition (Marcello)
- Demodulation and CRC (Lorenzo)
- Tracking system (Davide & Lorenzo)
- Algorithm testing and Homeworks (Davide & Mattia)

1222 • 2022  
**800**  
ANNI



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DEGLI STUDI  
DI PADOVA



# TRACKING SYSTEM

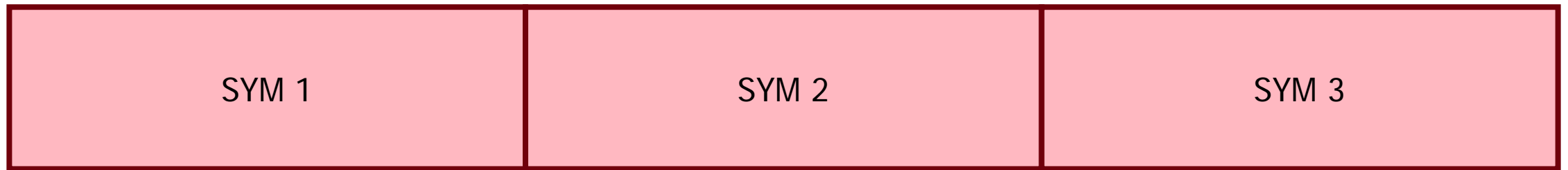
## DELAY AND DOPPLER ESTIMATION

**SATELLITE COMMUNICATIONS SYSTEMS**

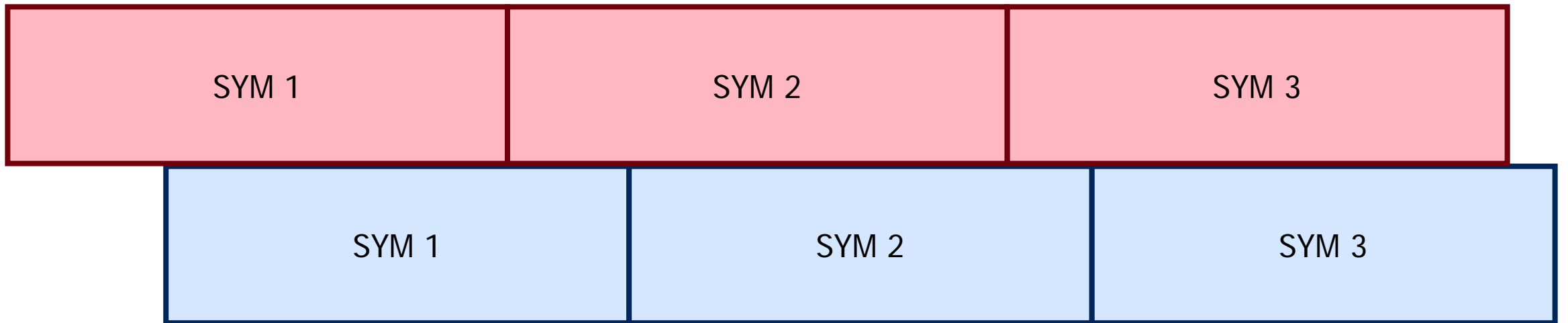
**13/05/2022**

**DAVIDE TOMASELLA**

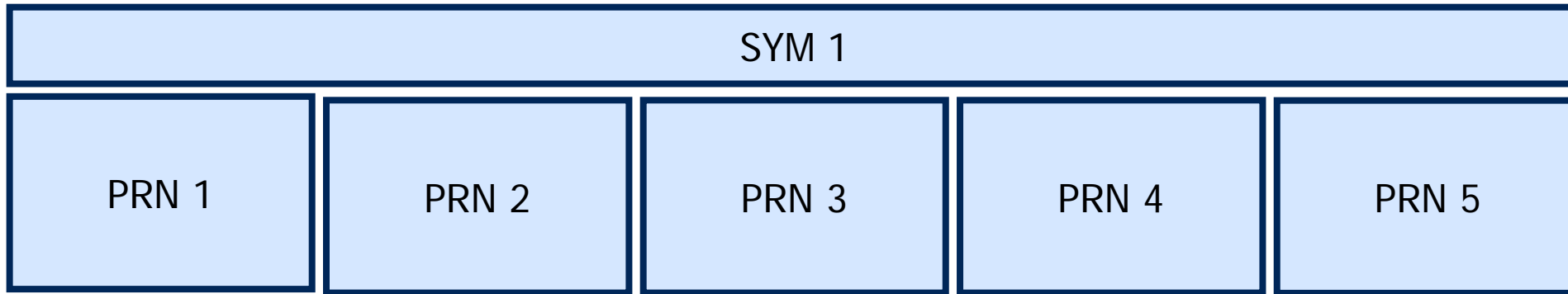
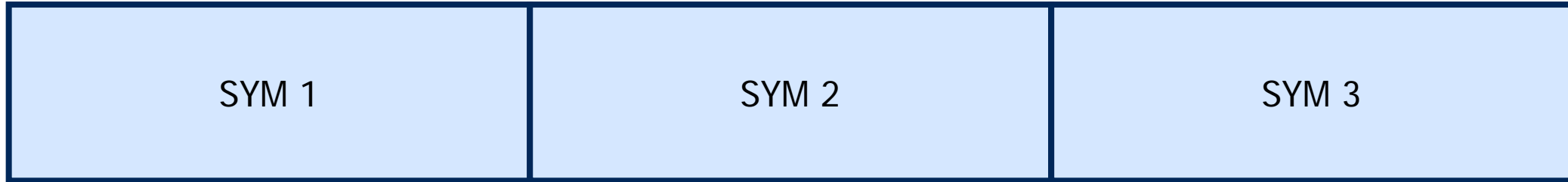
# SENT SIGNAL



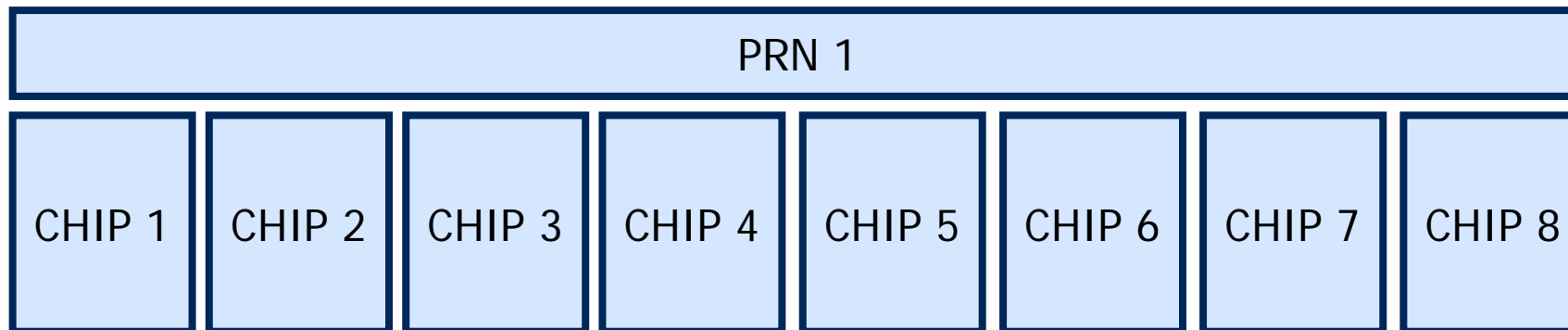
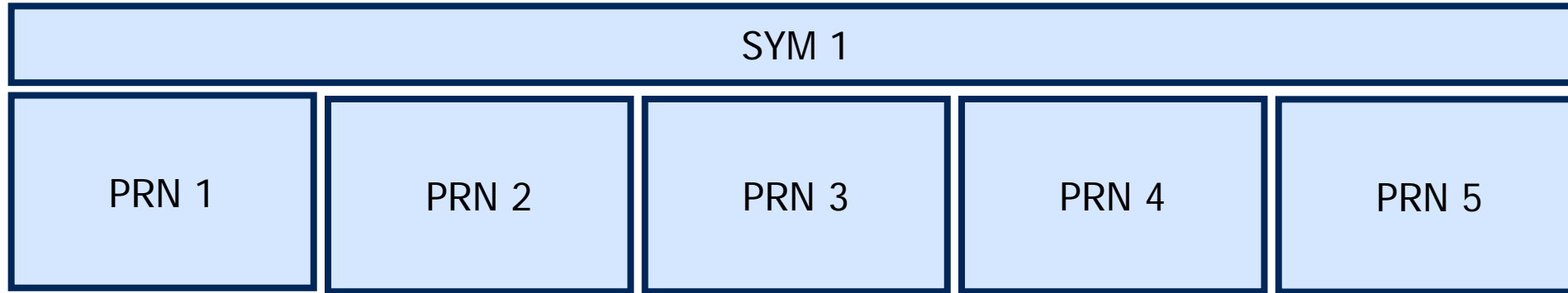
# RECEIVED SIGNAL



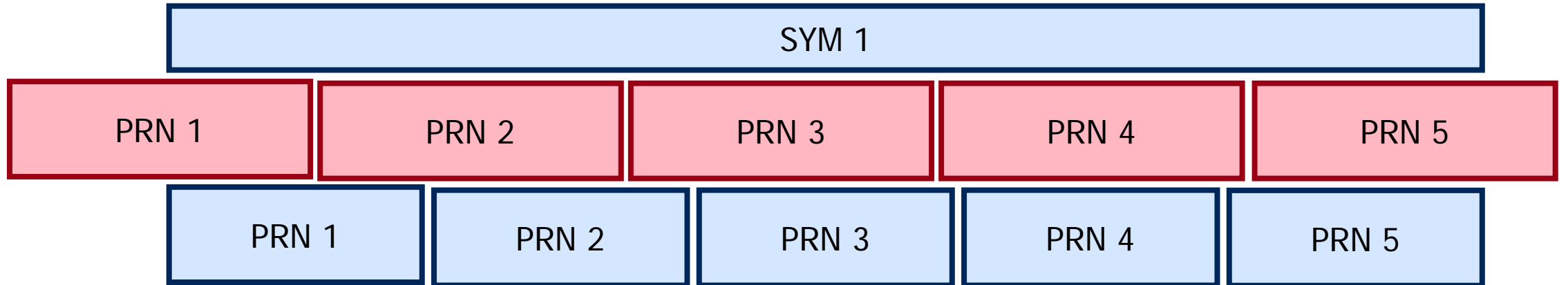
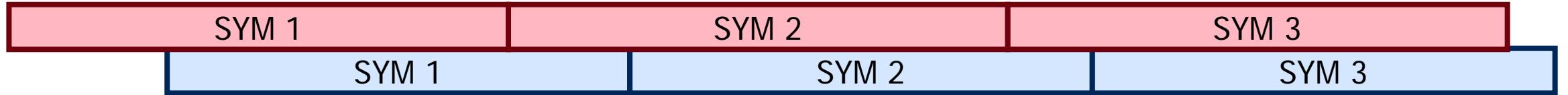
# SYMBOL COMPOSITION



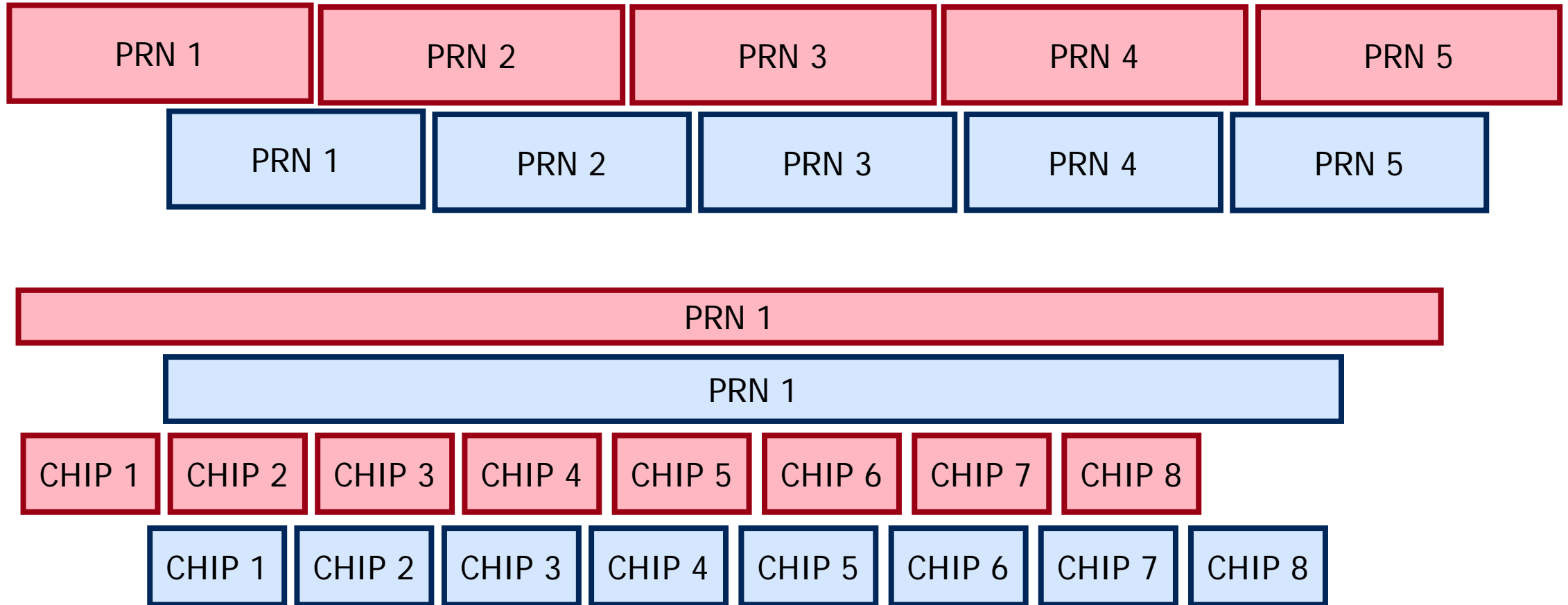
# PRN COMPOSITION



# SYMBOL PERIOD SHIFT

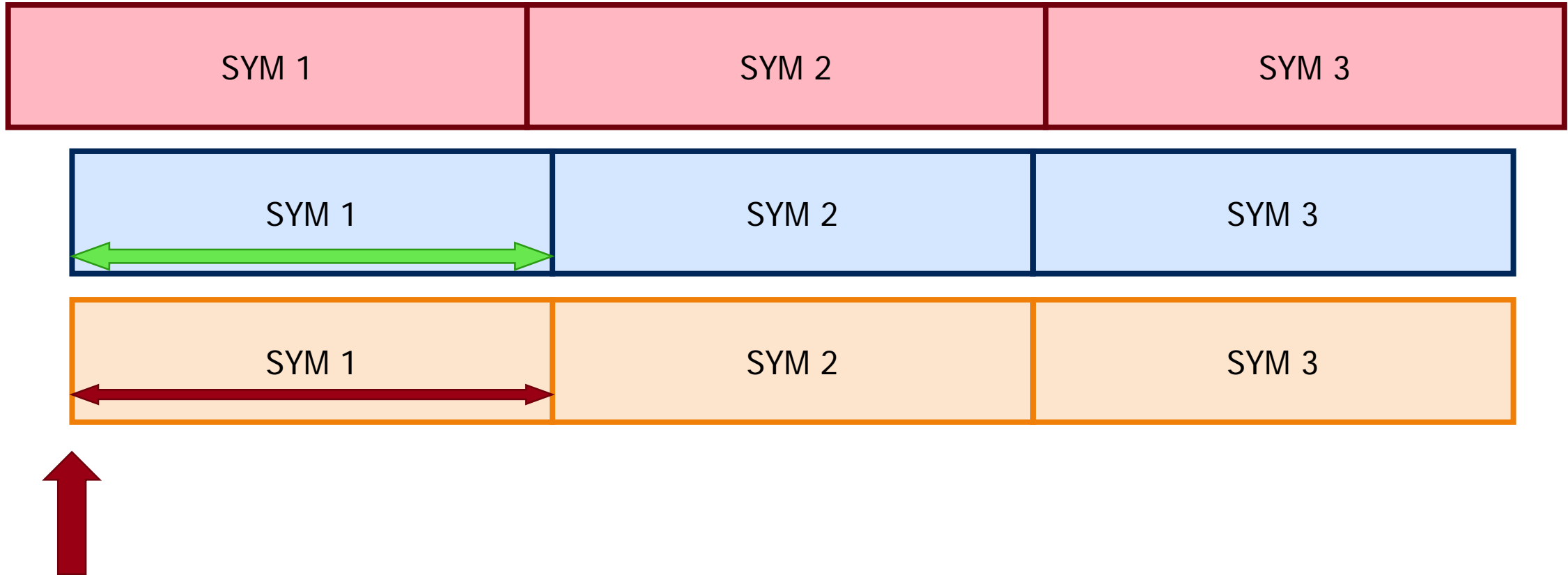


# CHIP PERIOD SHIFT

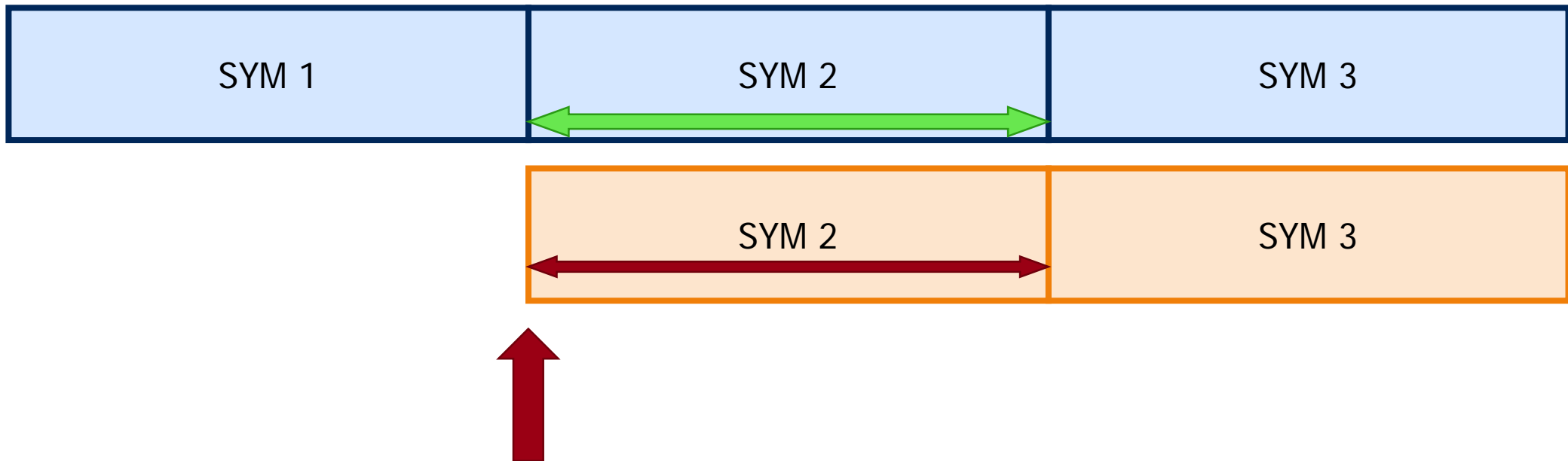




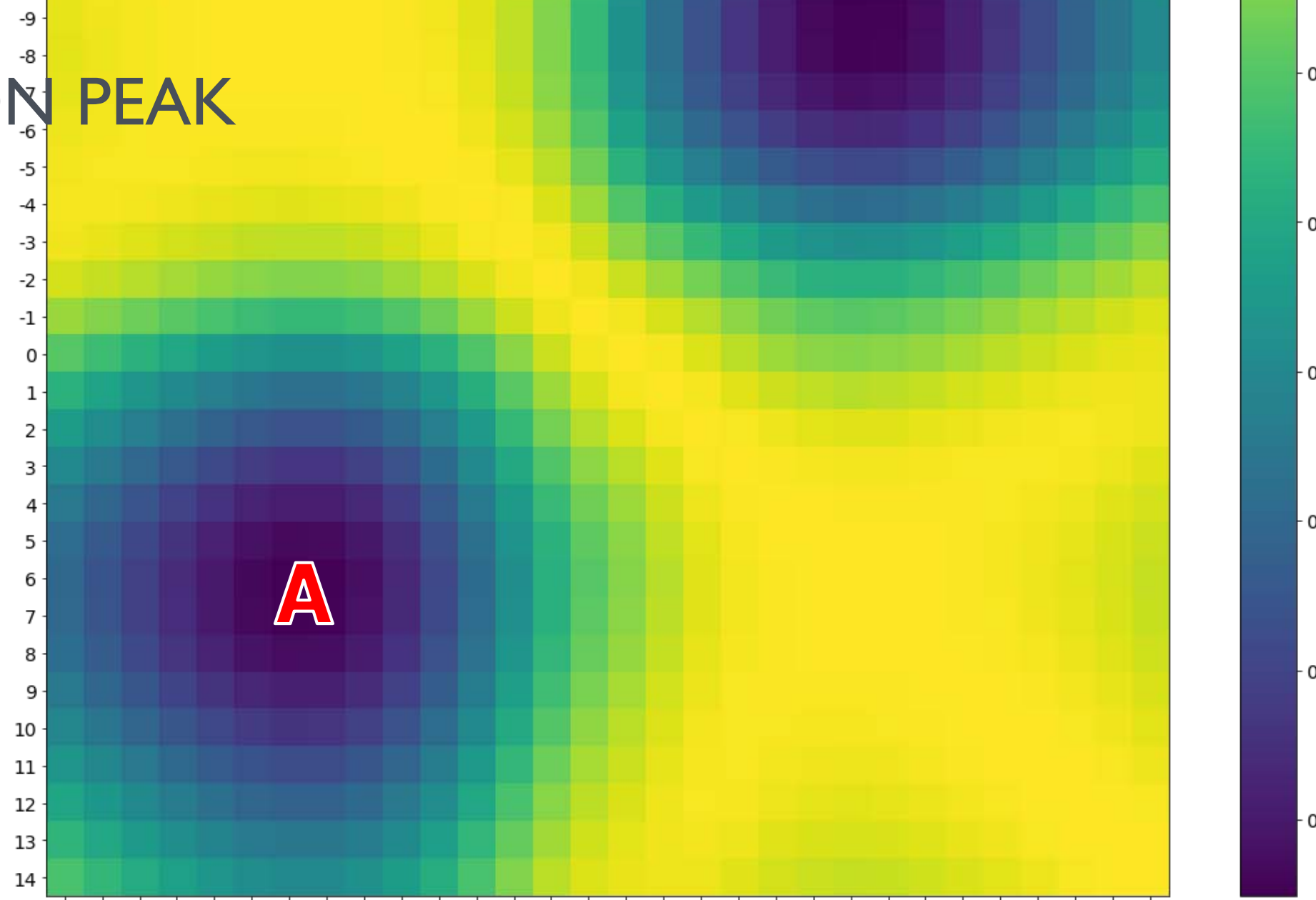
# CONSTANT DOPPLER (I)



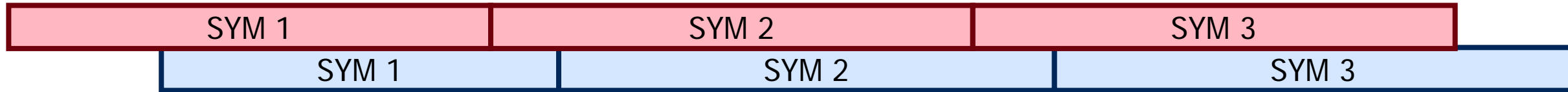
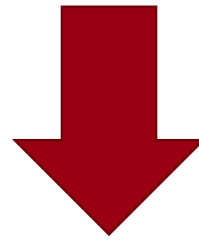
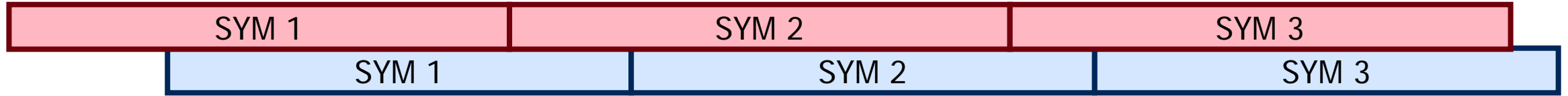
# CONSTANT DOPPLER (I)



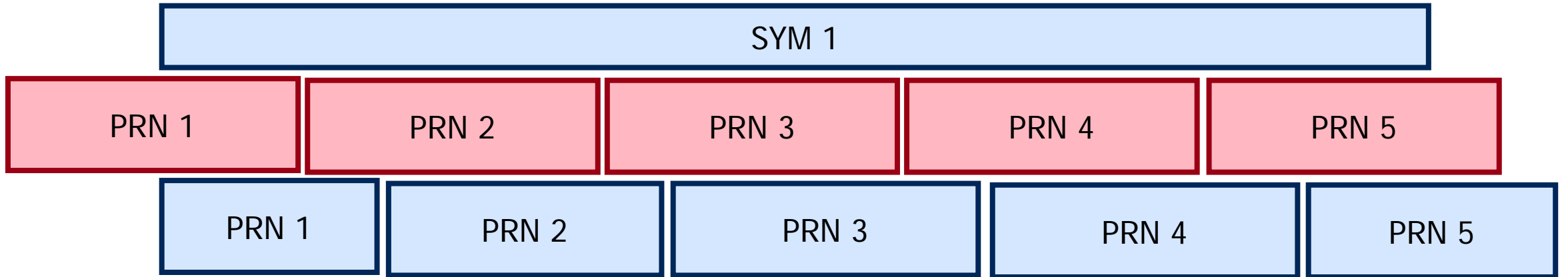
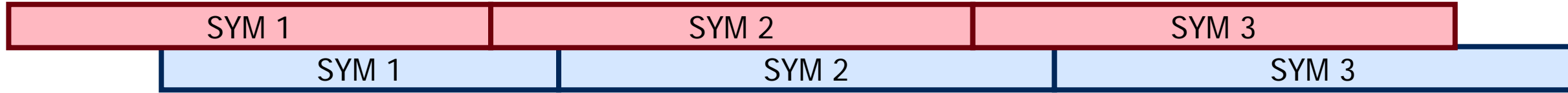
# CORRELATION PEAK



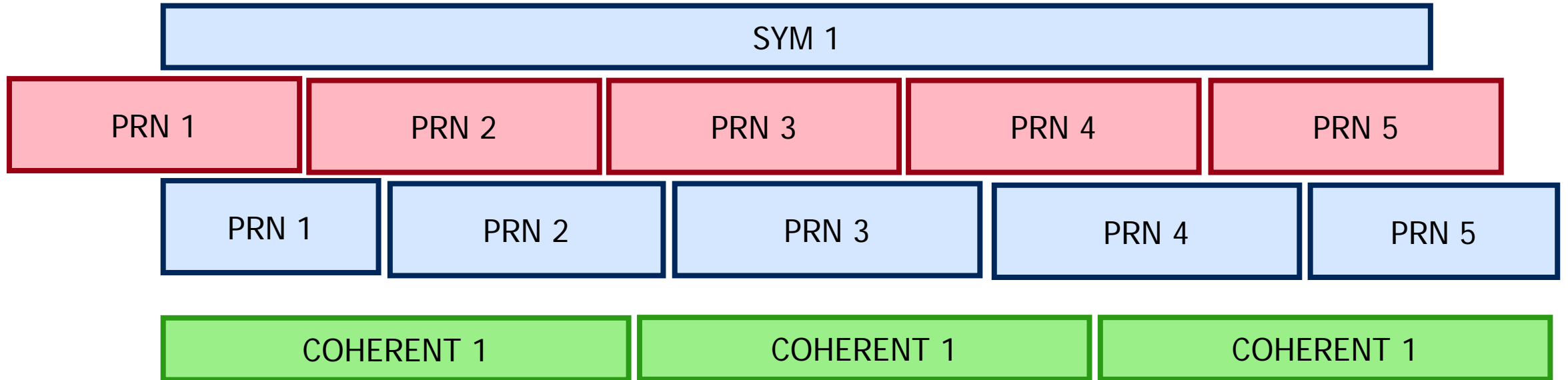
# VARIABLE DOPPLER (I)



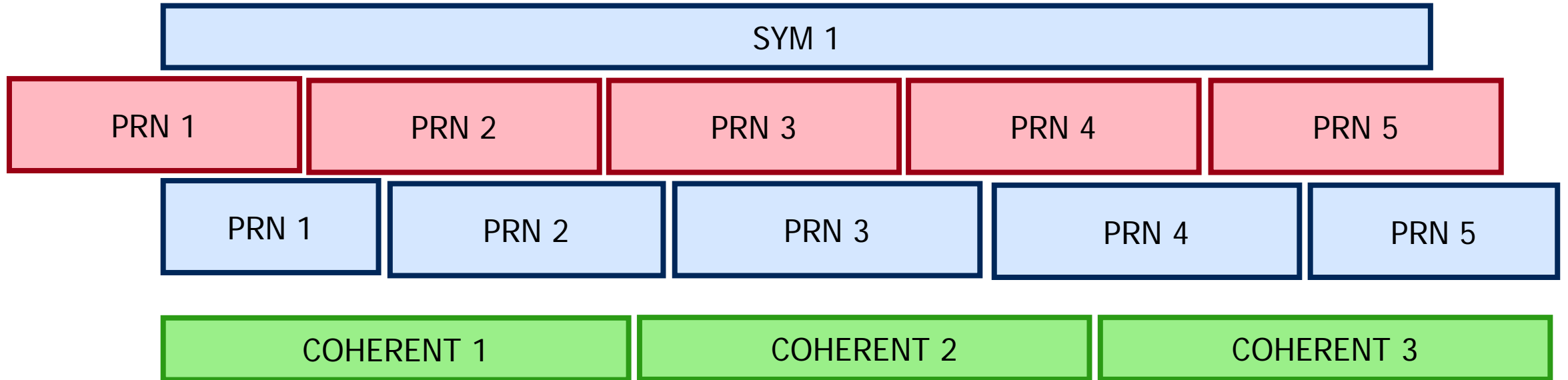
# VARIABLE DOPPLER (2)



# VARIABLE DOPPLER (3)

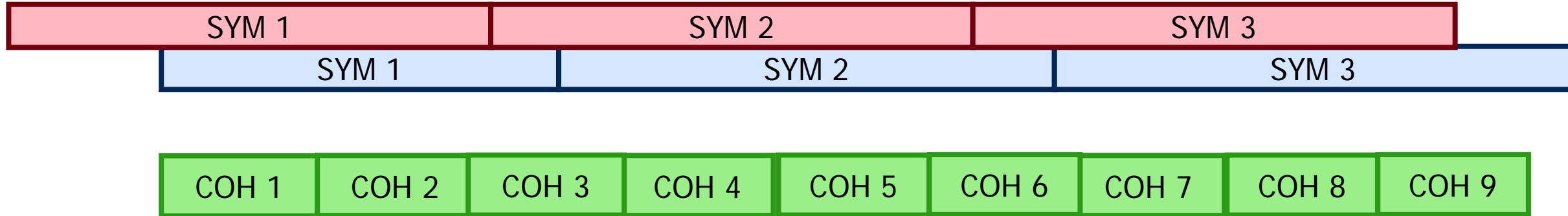


# VARIABLE DOPPLER (4)



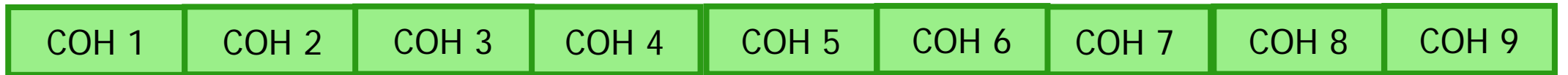
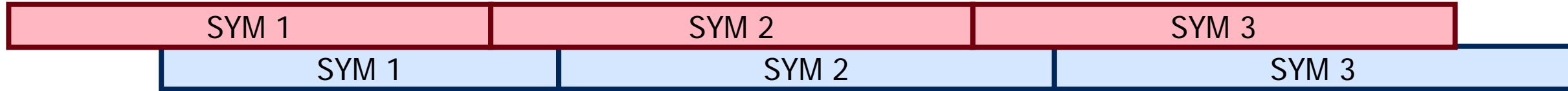
**ALMOST CONSTANT DOPPLER  
IN EACH FRACTION**

# VARIABLE DOPPLER (5)



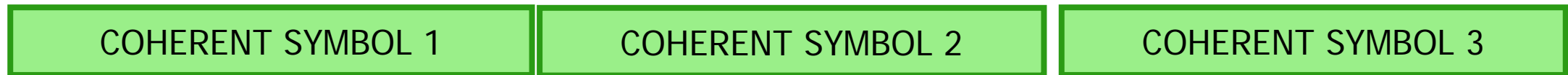
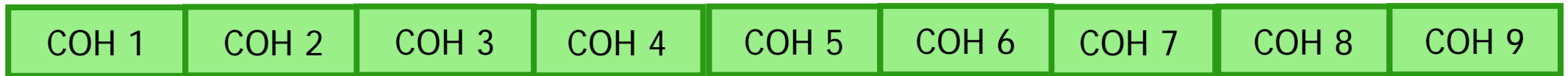
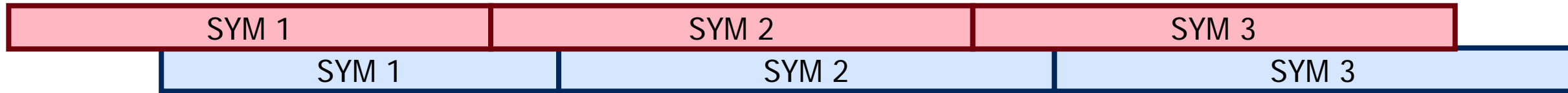


# VARIABLE DOPPLER (6)



**MAXIMUM CORRELATION  
BEST TRACKING POINT**

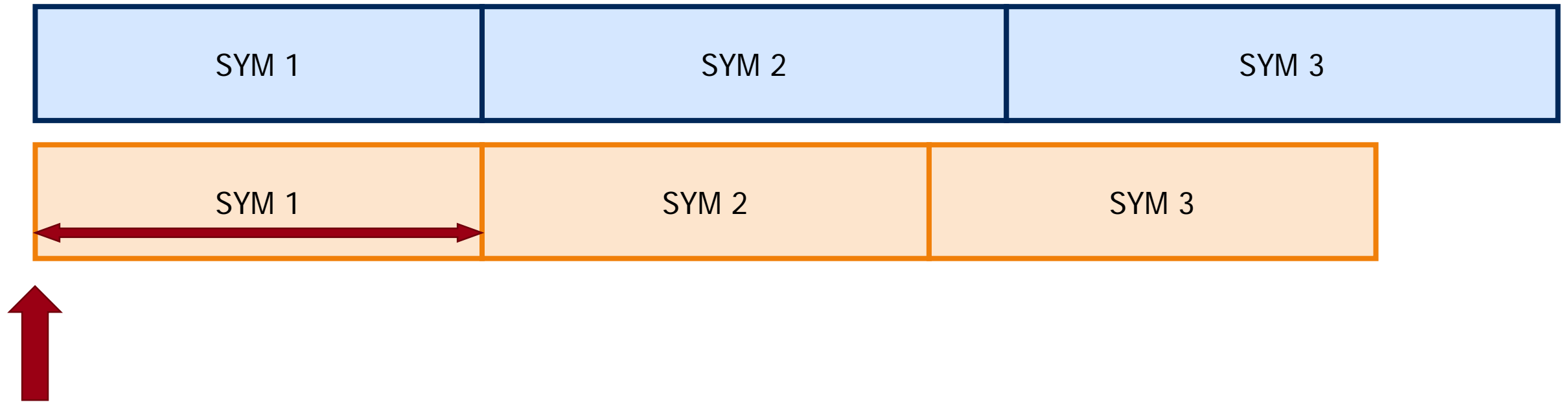
# VARIABLE DOPPLER (7)



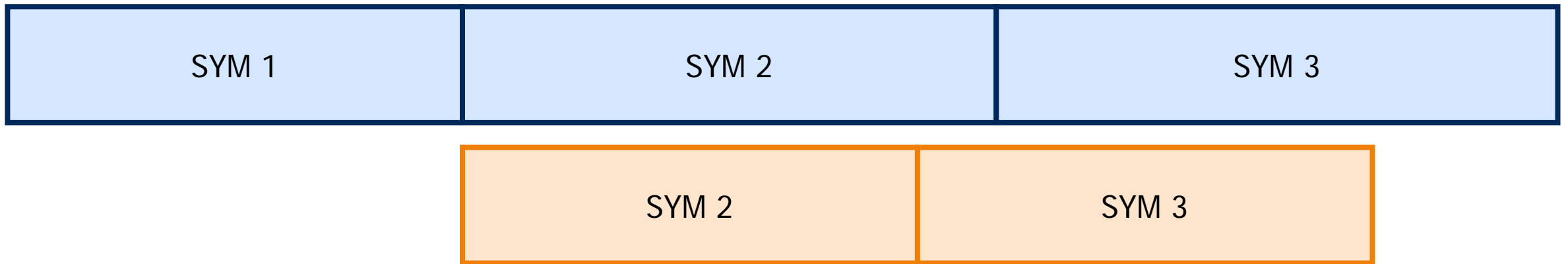
**KEPT PHASE INFORMATION  
BEST DEMODULATION?**

# CAN WE TRACK THE VARIATIONS???

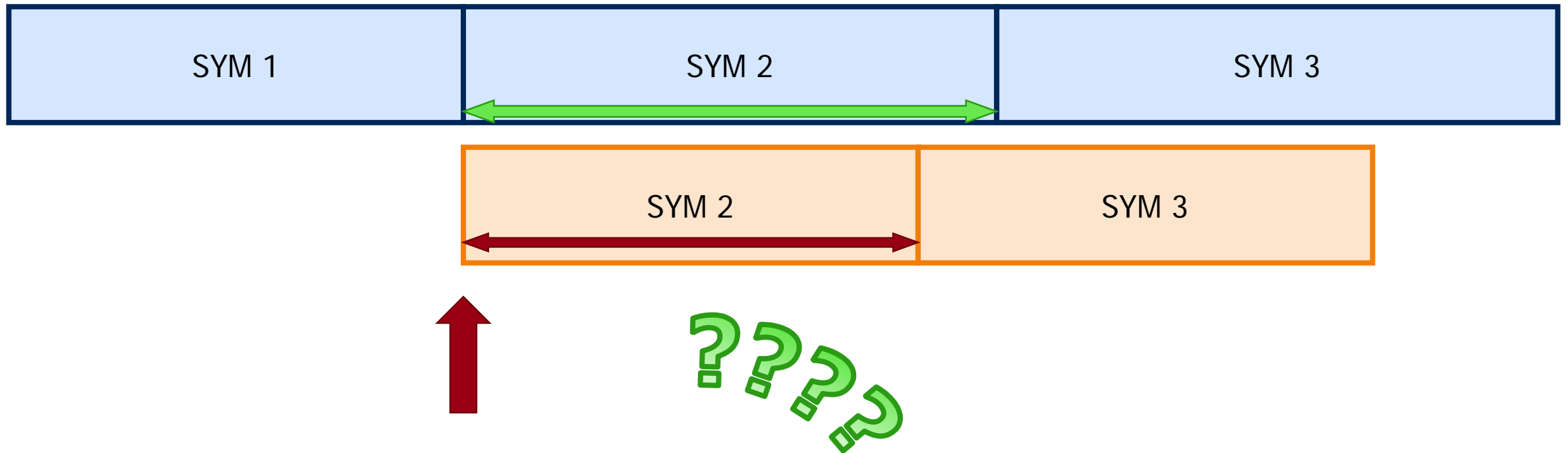
# DOPPLER VARIATION (I)



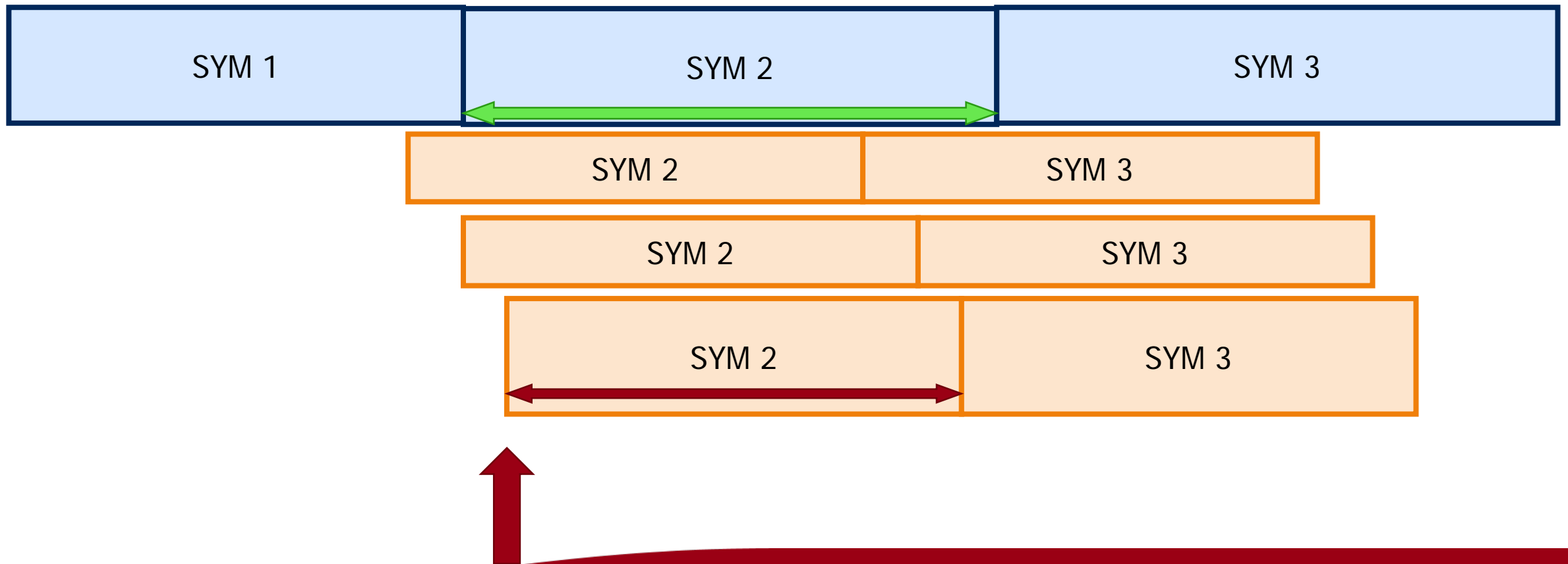
# DOPPLER VARIATION (2)



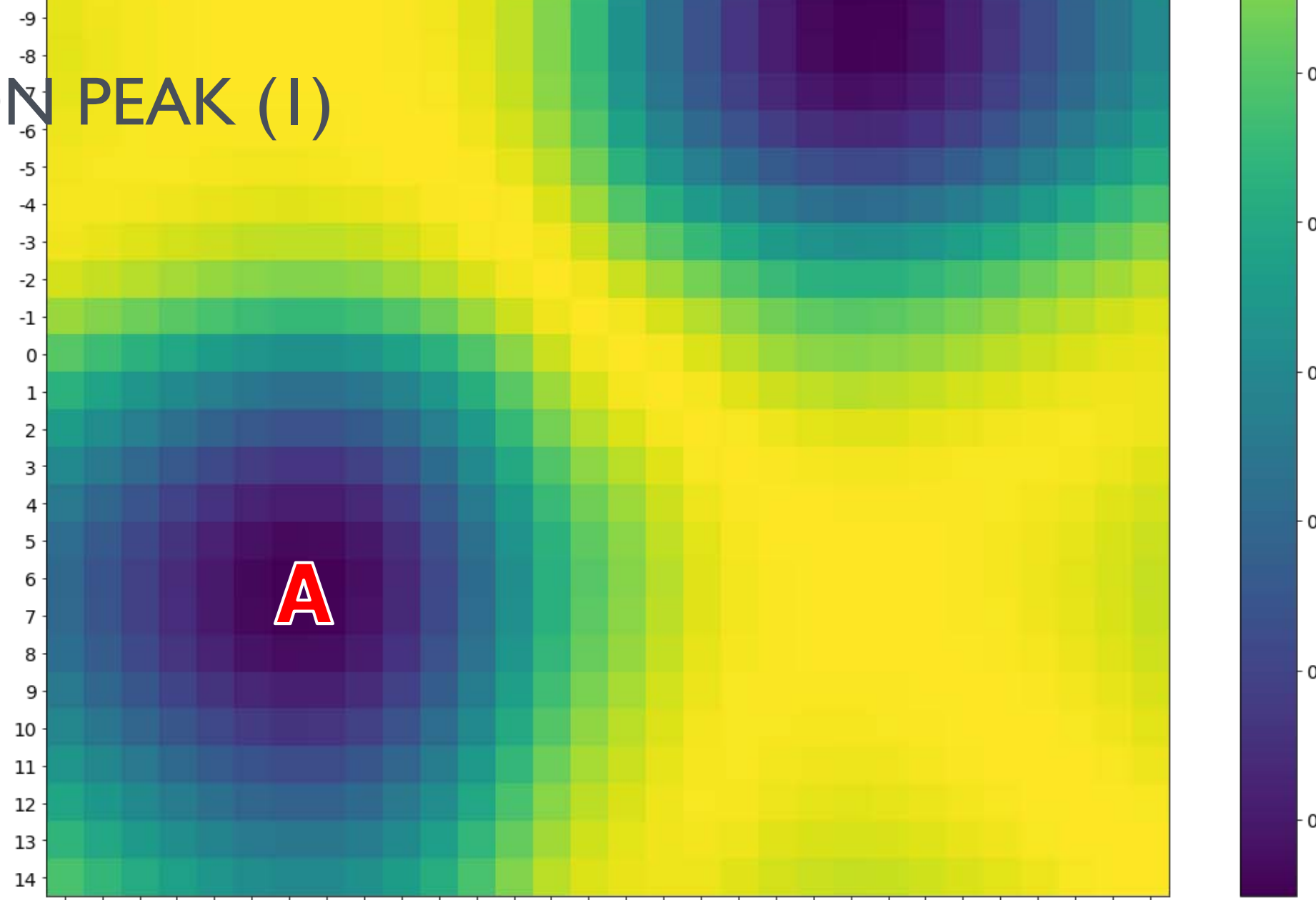
# DOPPLER VARIATION (2)



# DOPPLER VARIATION (3)

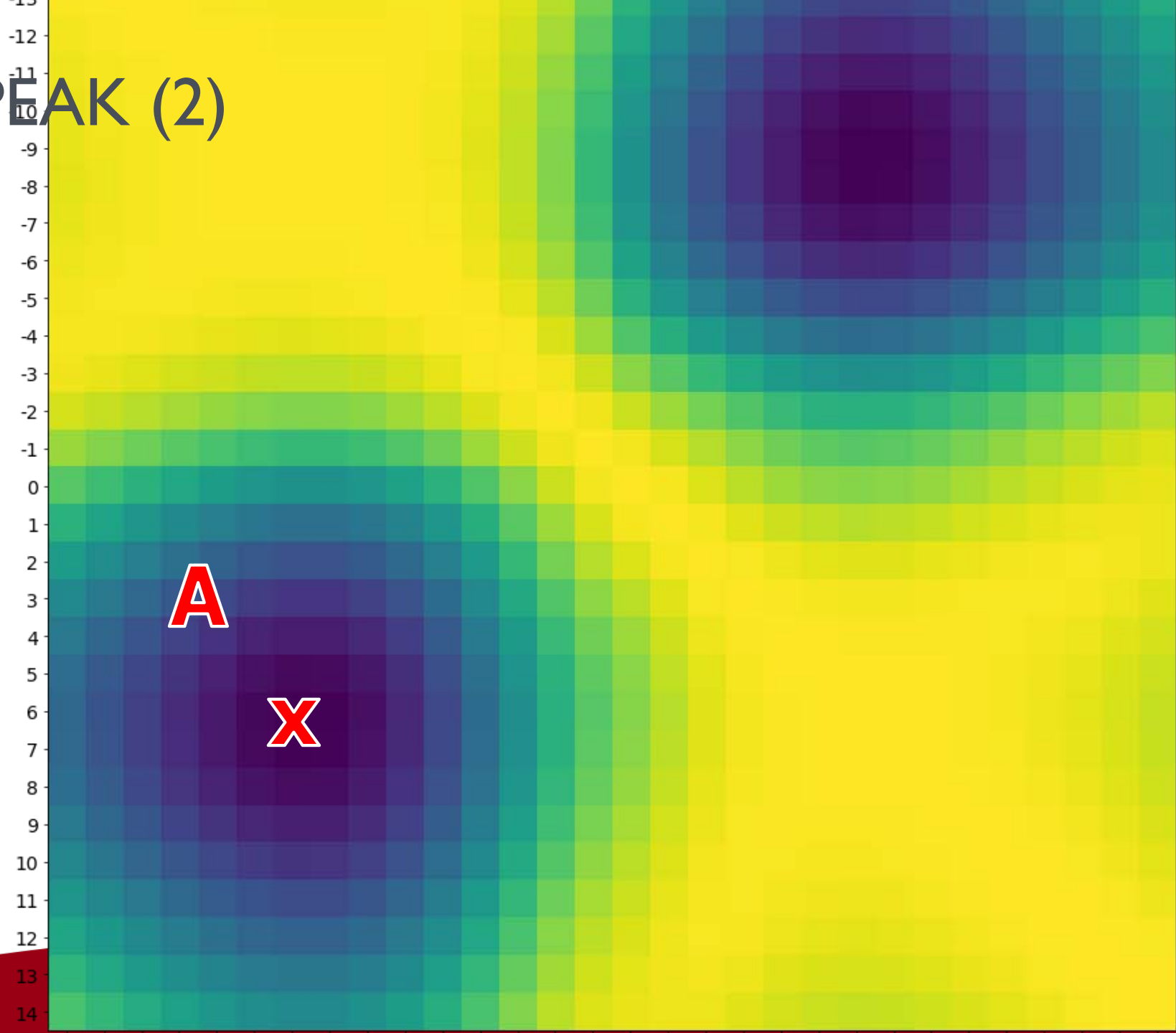


# CORRELATION PEAK (I)

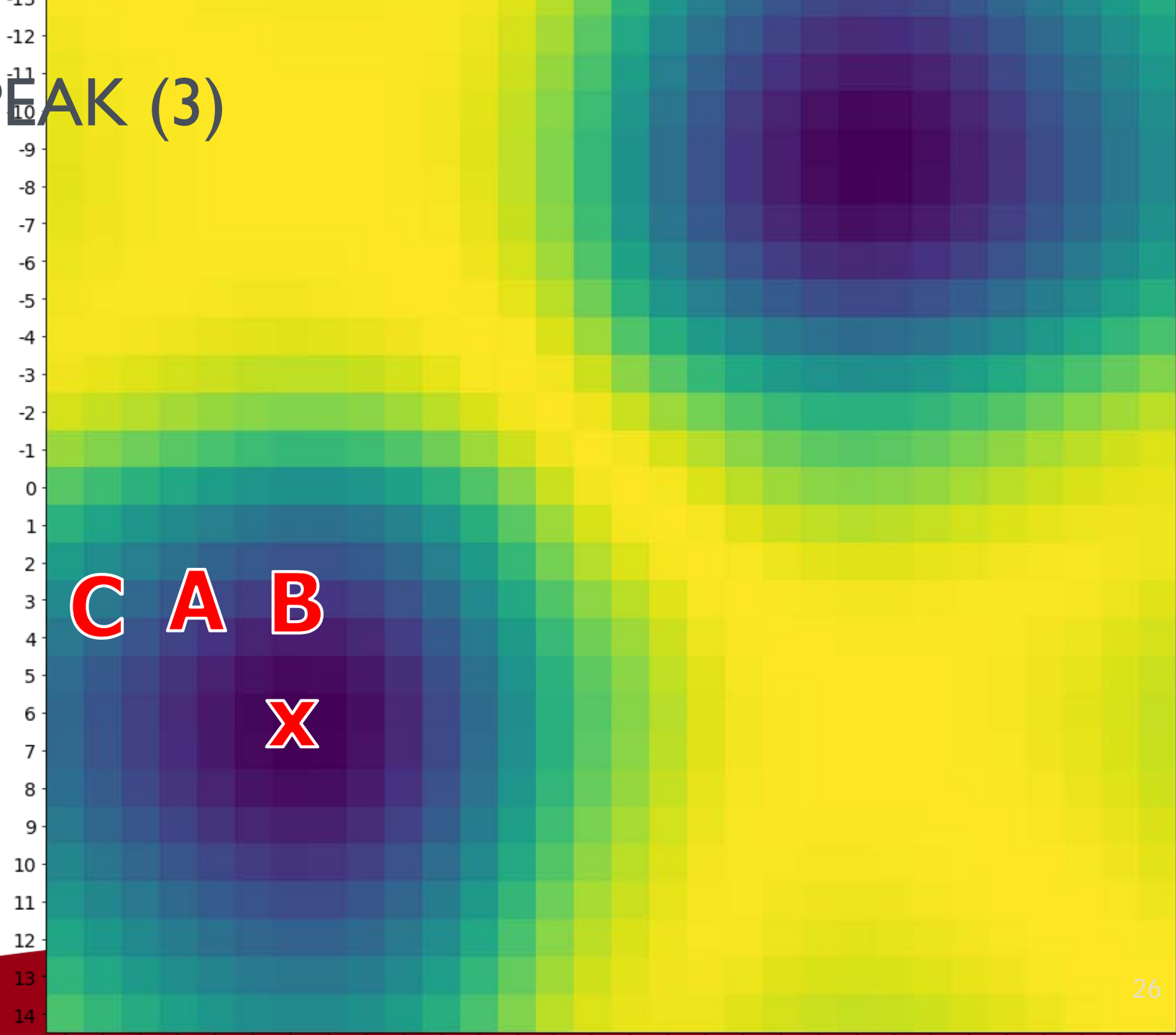




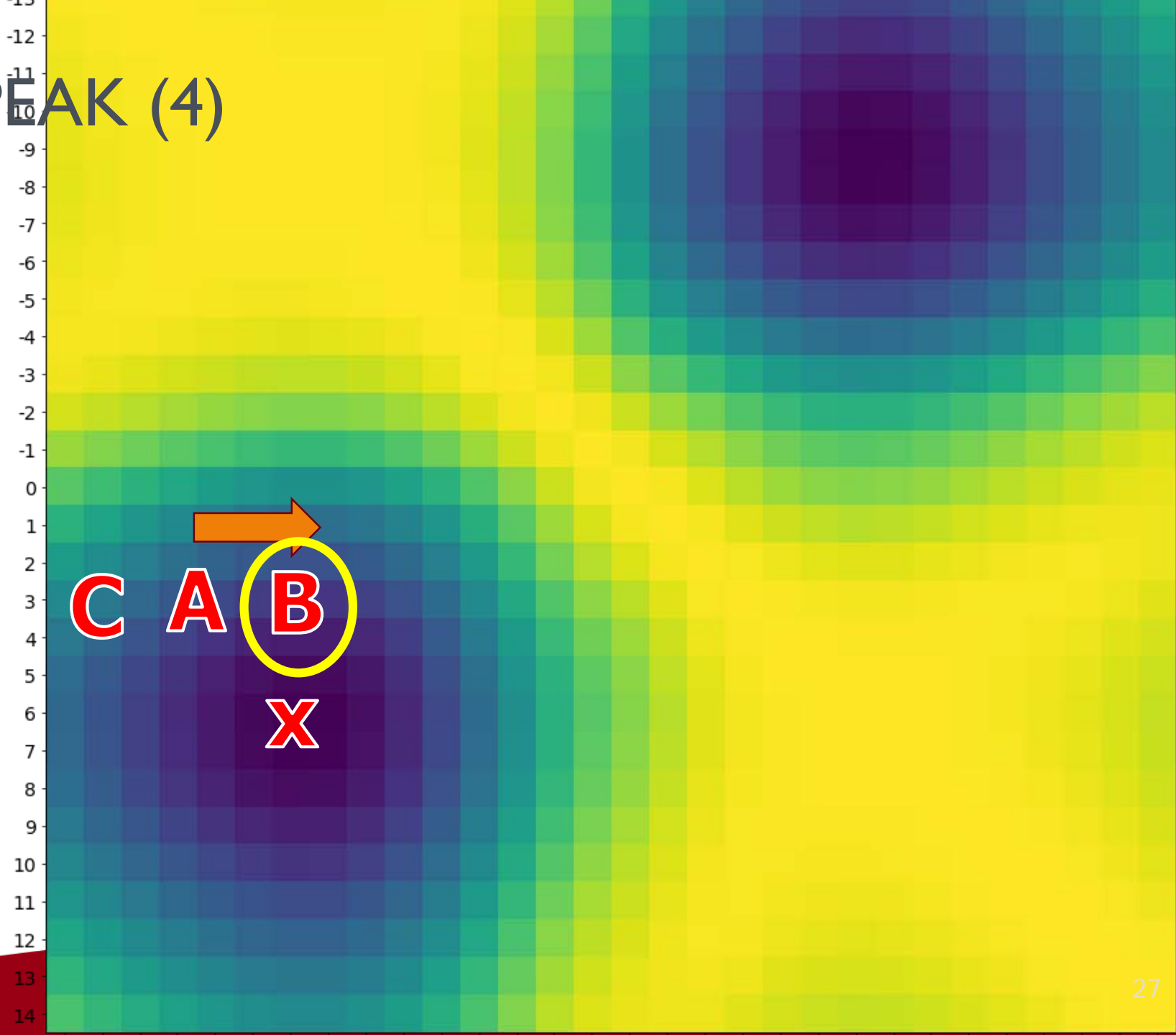
# CORRELATION PEAK (2)



# CORRELATION PEAK (3)

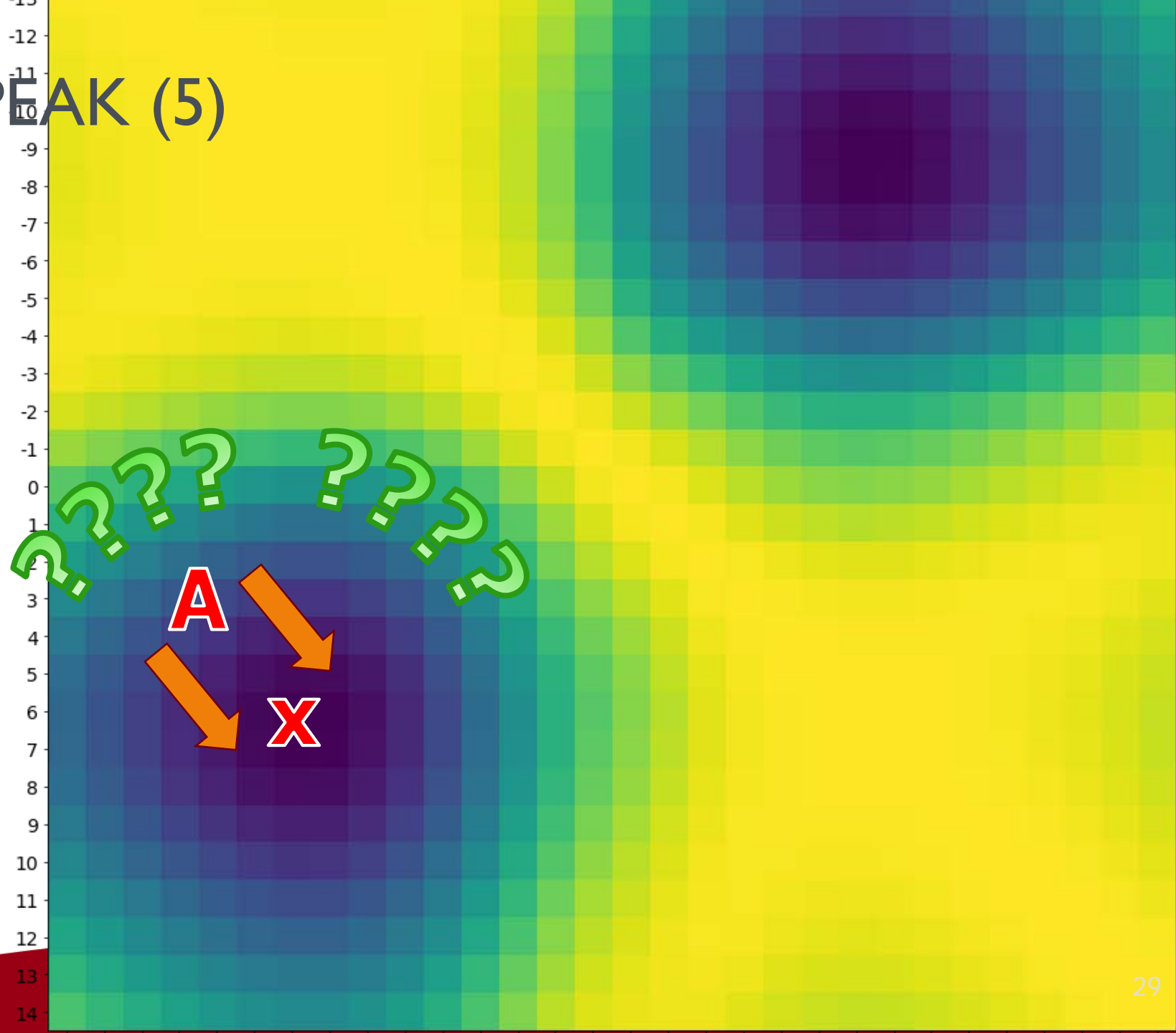


# CORRELATION PEAK (4)

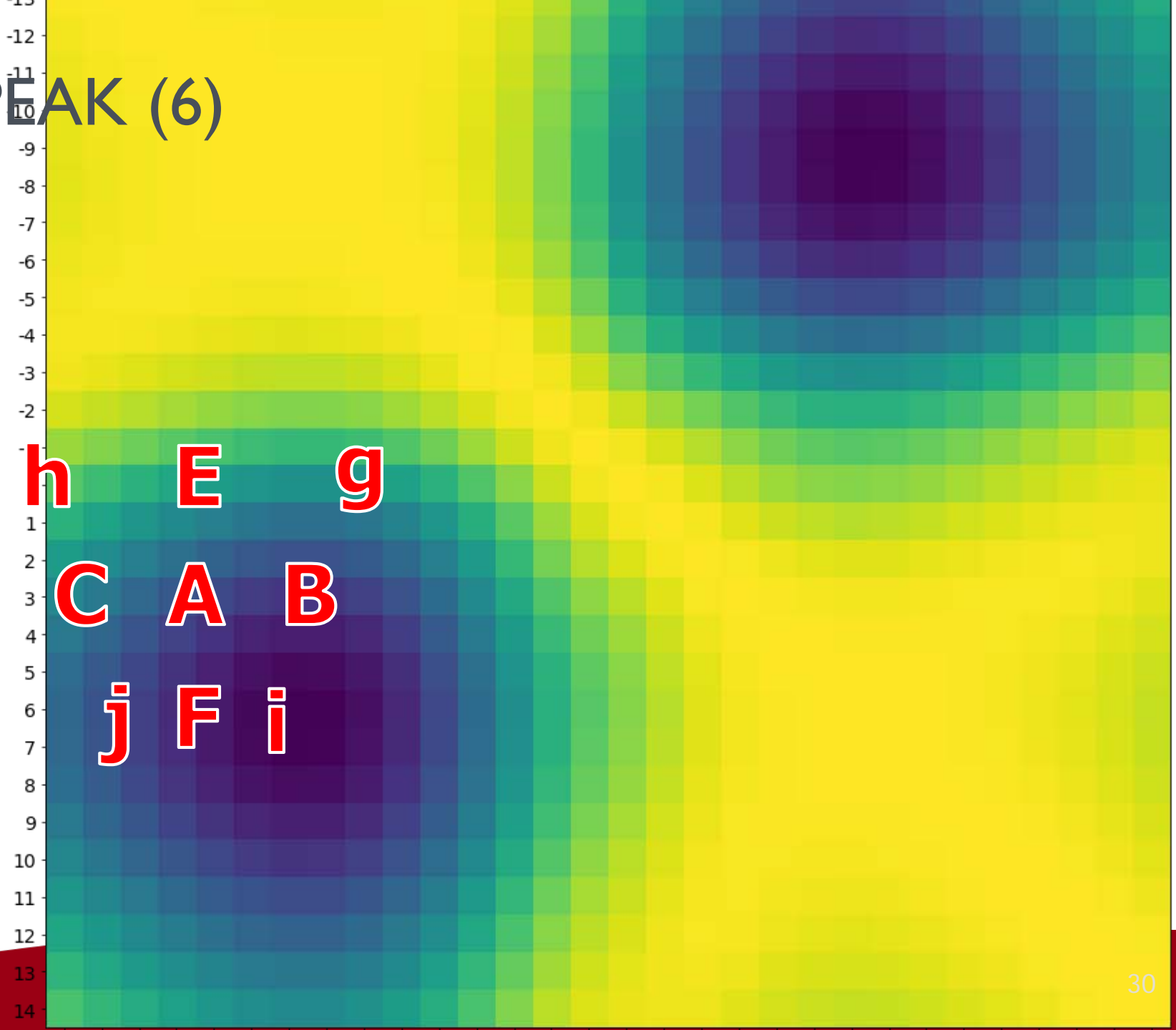


CAN WE DO BETTER???

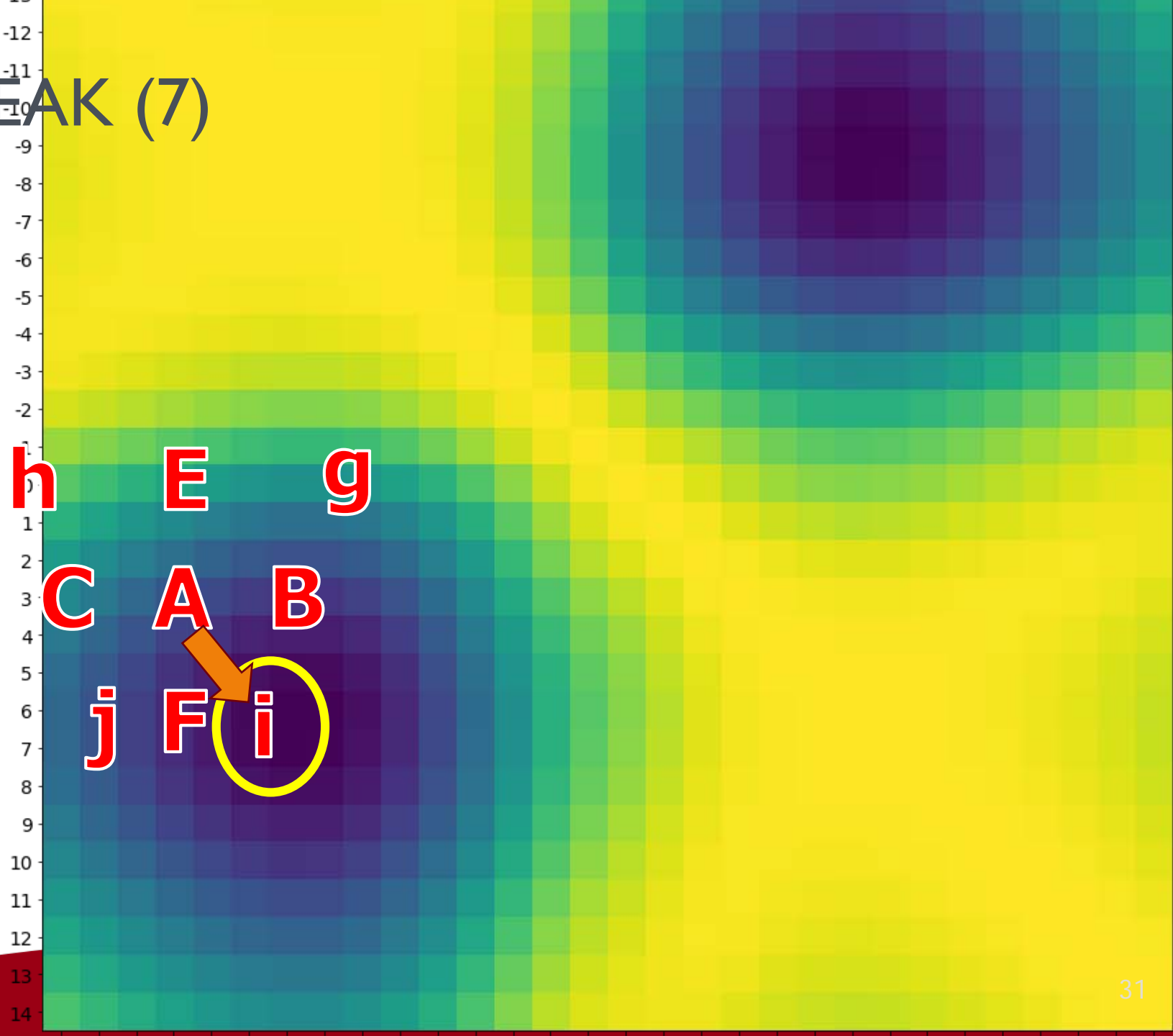
# CORRELATION PEAK (5)



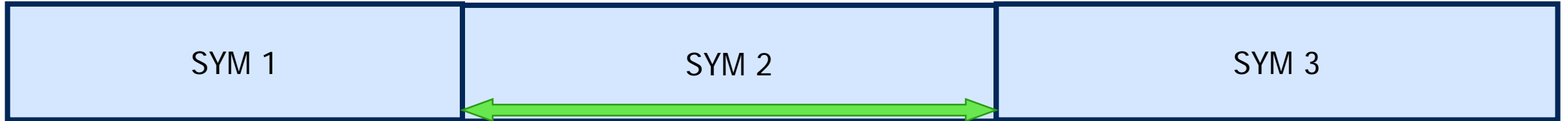
# CORRELATION PEAK (6)



# CORRELATION PEAK (7)

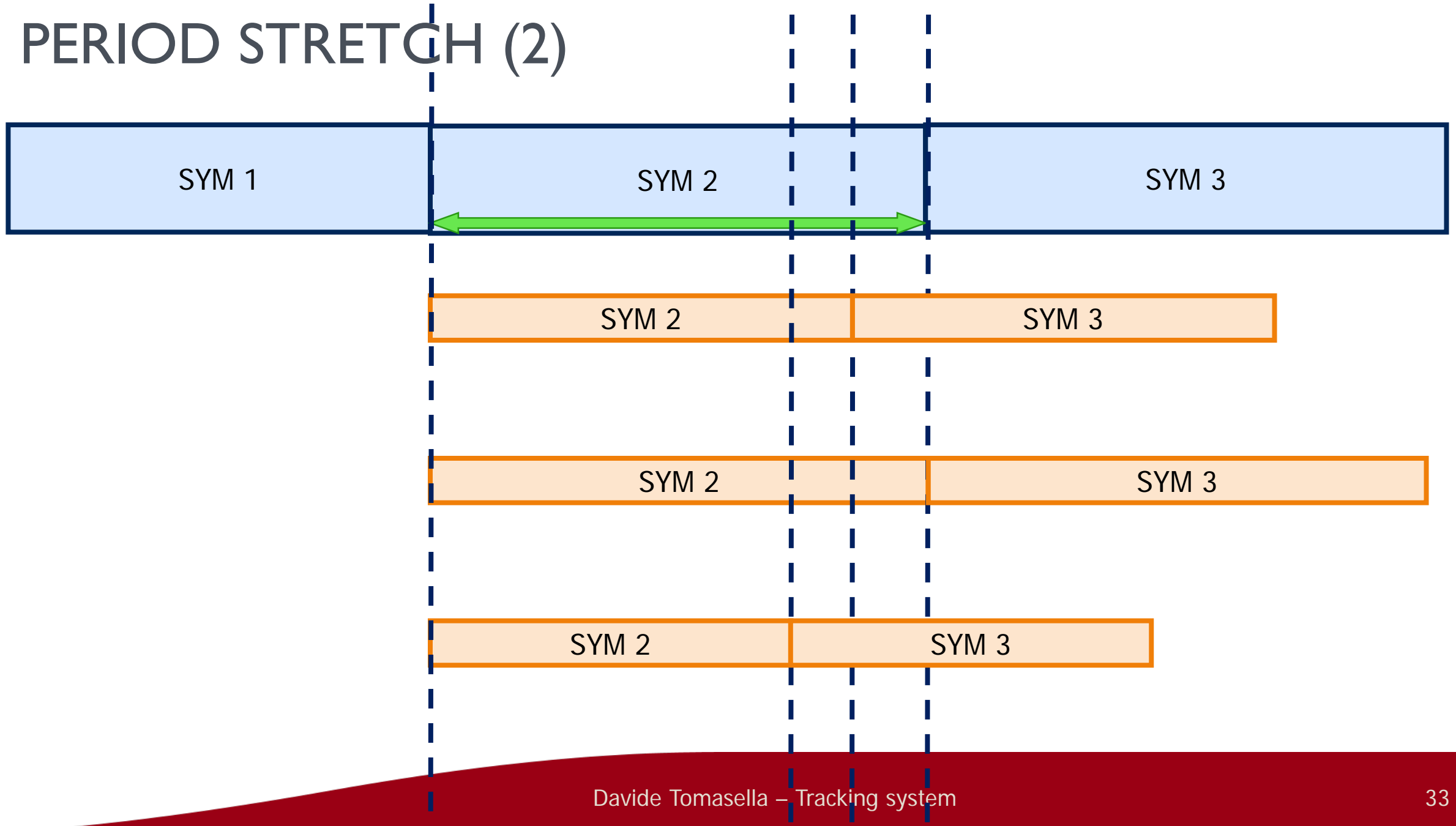


# PERIOD STRETCH (I)

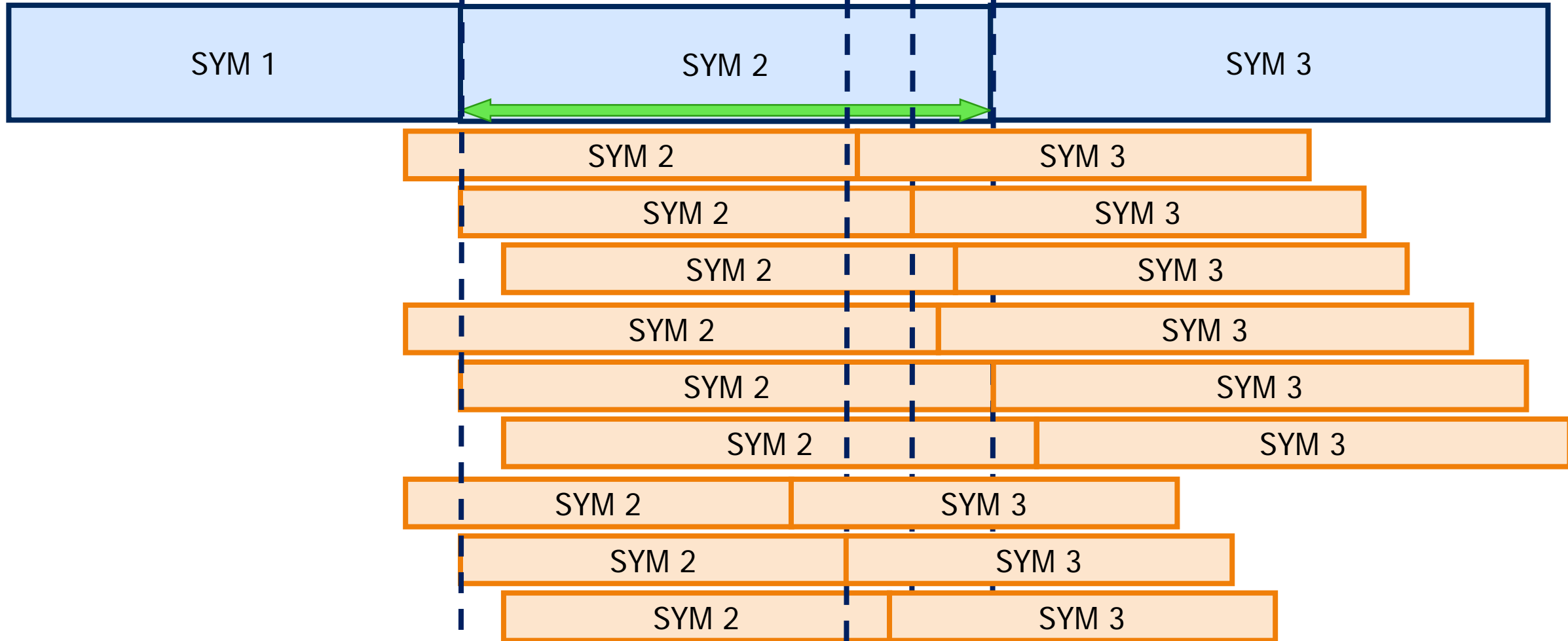




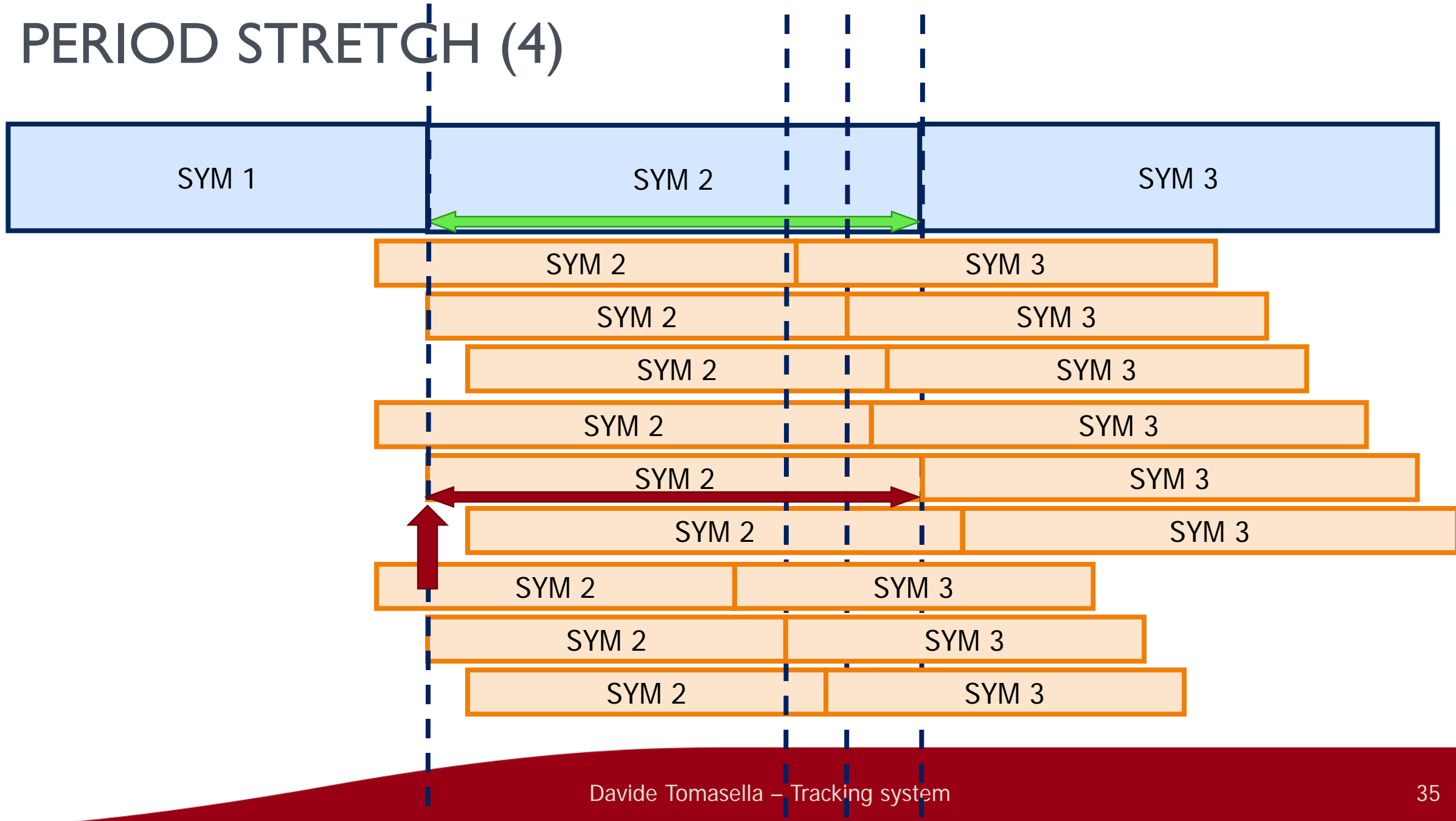
# PERIOD STRETCH (2)



# PERIOD STRETCH (3)



# PERIOD STRETCH (4)



SO COOL BUT IT WORKS???