



Ann-Kathrin Perrevoort for the LHCb group

Flavour Physics

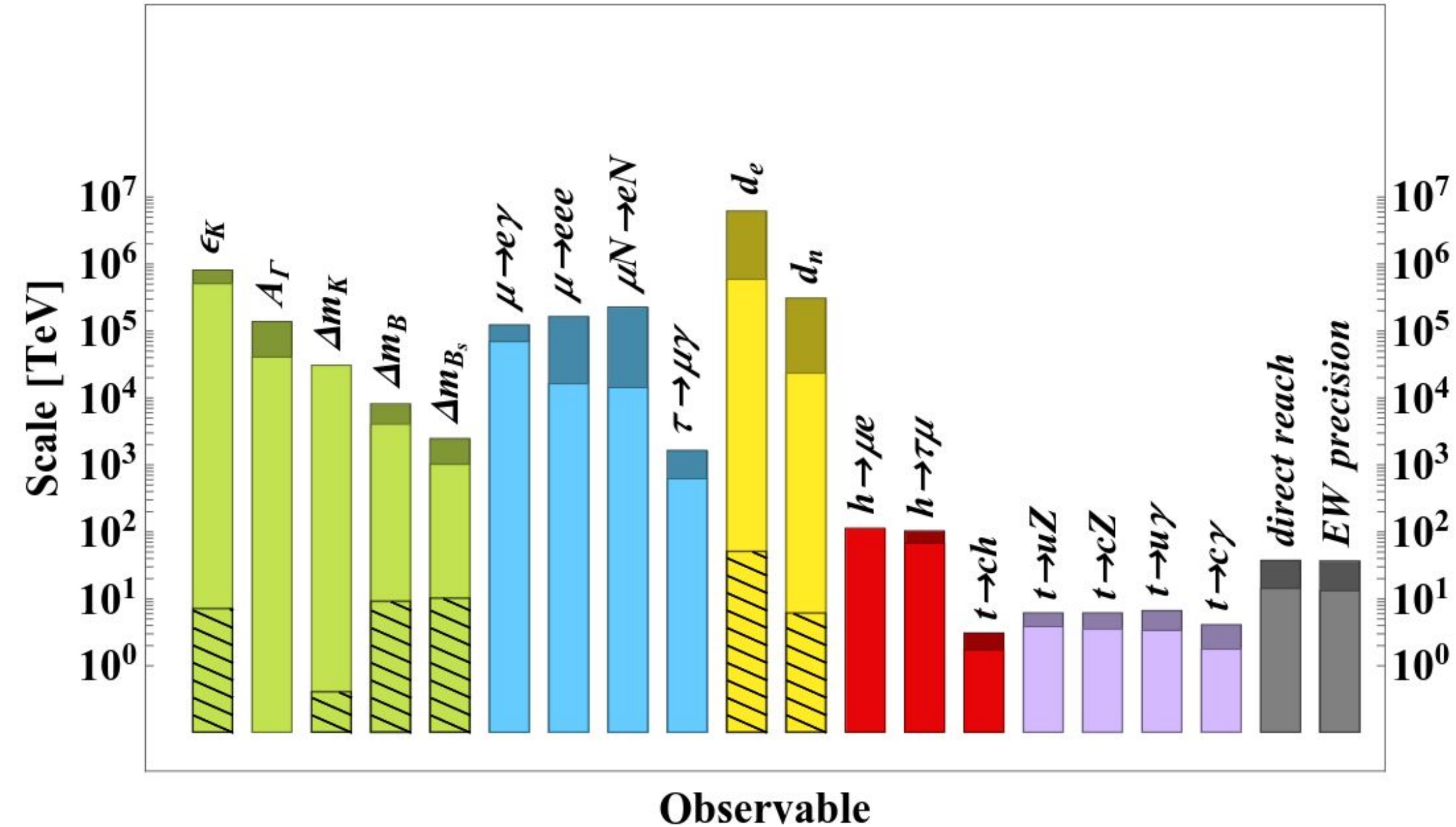
Nikhef Strategy Day
15 October 2024



“Flavour physics should remain at the forefront of the European Strategy”

[ESPPU2020]

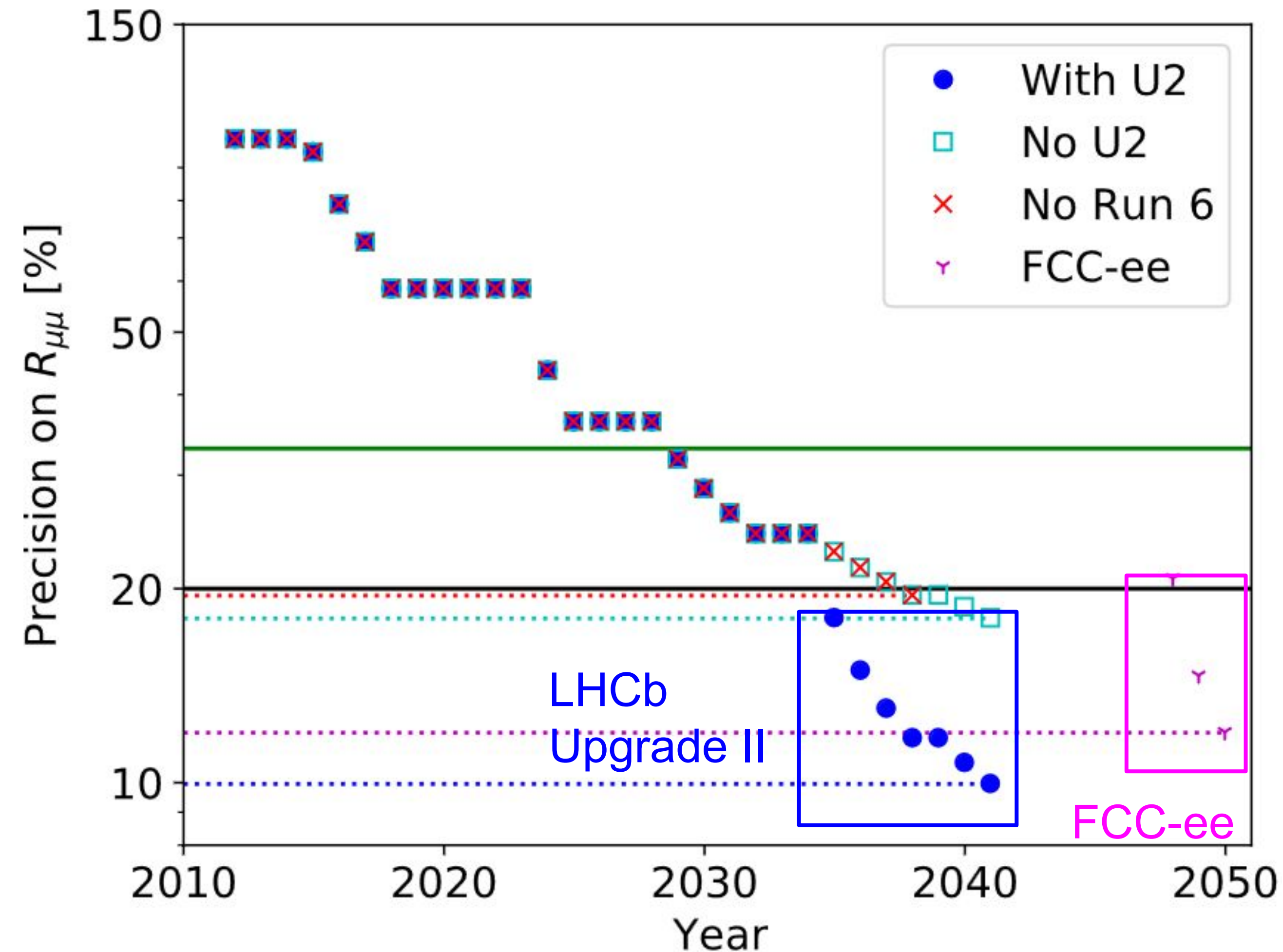
- **Flavour puzzle** is a big open question of the SM
 - 3 generations of leptons
 - Masses & mixings:
 - Higgs couplings \leftrightarrow flavour structure
 - CPV \leftrightarrow baryon asymmetry
- **Complementary** to direct searches
- Sensitivity to **very large BSM mass scales** and light dark matter



[ESPPU2020]

Flavour Physics: LHCb Upgrade II is High Priority

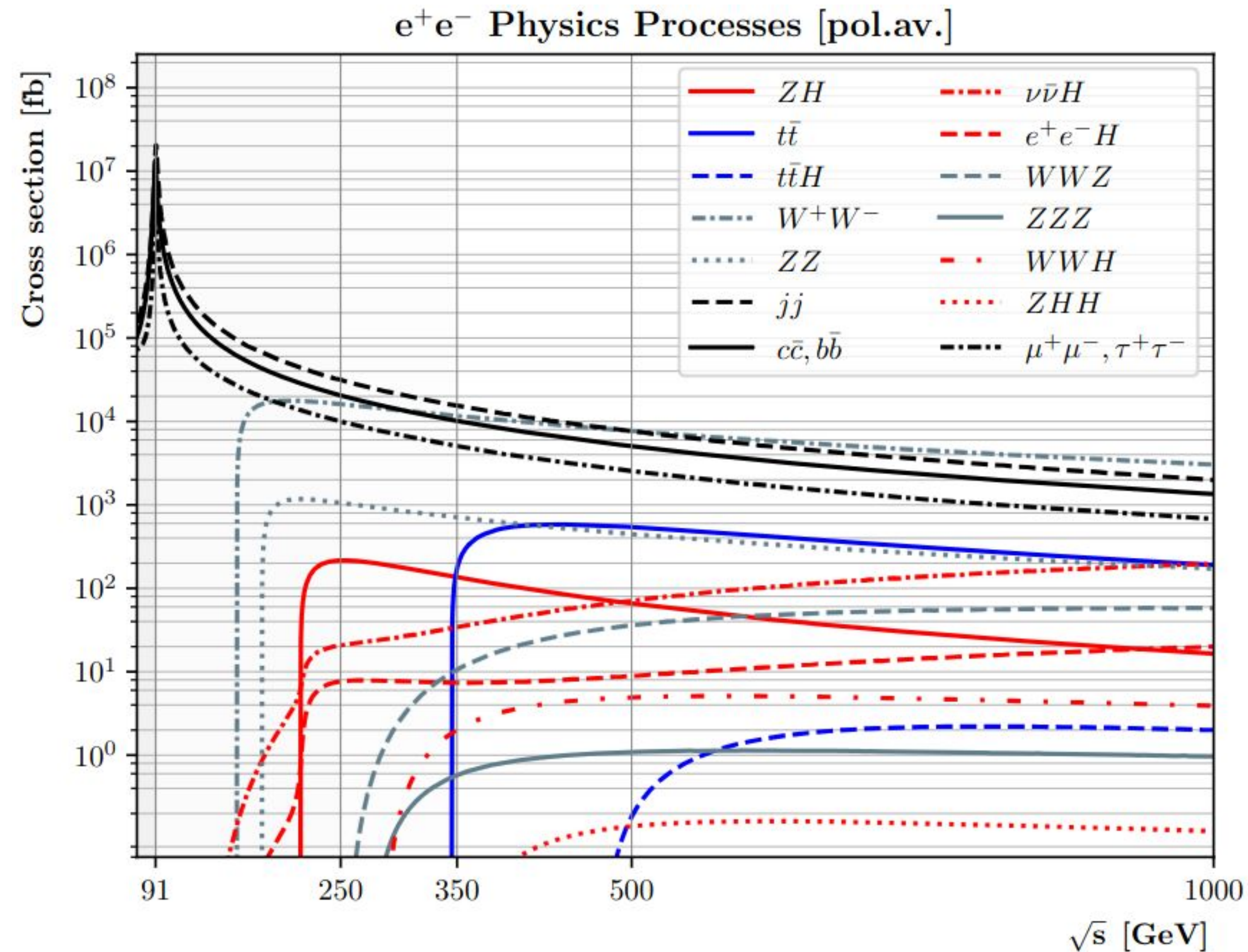
- LHCb reaches full potential with **Upgrade II**
 - Largest impact in flavour physics from **Run 5 & 6**
 - e.g. factor 2 in BSM mass scales wrt Upgrade I
- Future e^+e^- collider can't always match performance



[Wilkinson, Monteil; arXiv:2106.01259]

Flavour Physics @ Future Colliders

- Continue exploration of flavour puzzle
- **Diverse flavour physics program at future e^+e^- colliders**
 - precision studies @ **Z pole** (*circ. coll.*)
b/c hadrons: V_{cb} , $b \rightarrow sTT$, CPV, ...
 - precision studies @ **higher E** (*lin. coll.*)
Higgs couplings, top decays, ...



- Exciting **flavour physics at all e^+e^- collider options**
- Flavour physics alone doesn't justify running at Z-pole