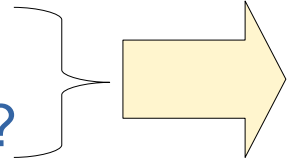


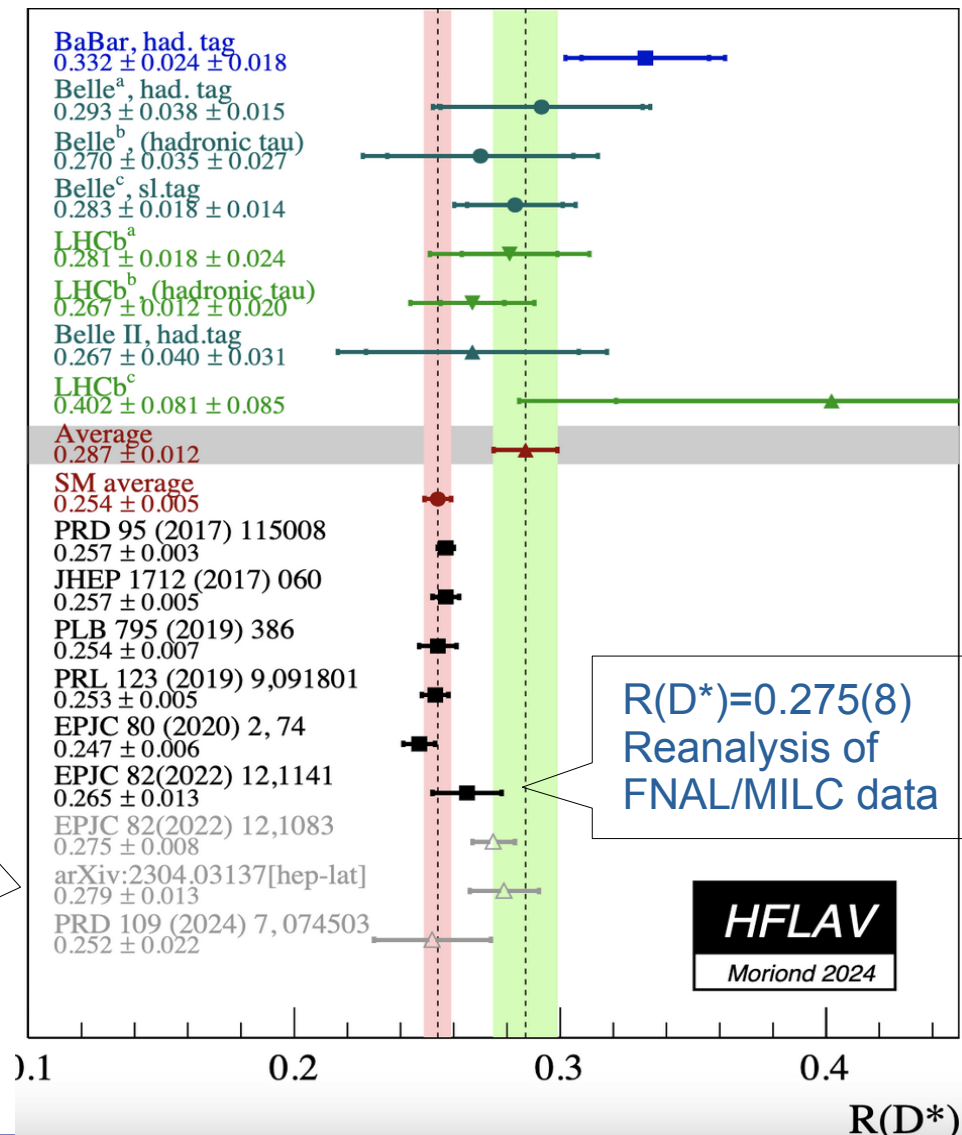
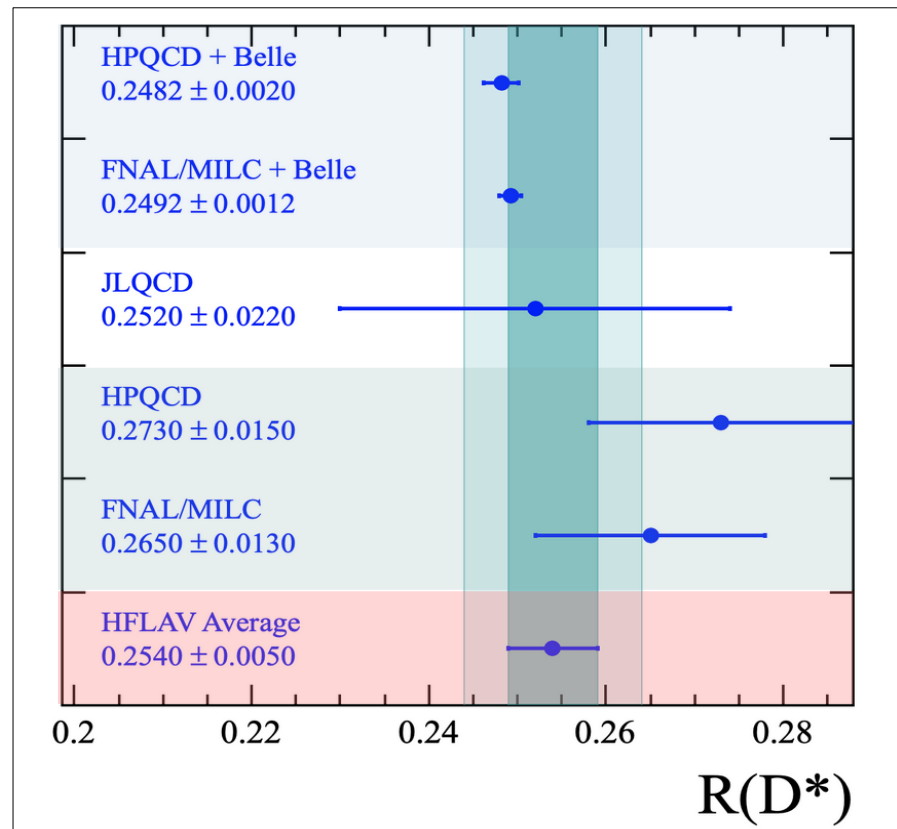
Discussion points: theory

- Predictions on $R(D)$ - $R(D^*)$ (and similar observables)
 - How solid are they?
 - Differences with and w/o experimental inputs: any concerns?
 - Things not evaluated yet (relevant with higher precision)
 - QED corrections (PHOTOS, Coulomb correction,...)
- There are also other b-hadrons to consider
 - B_s , J/ψ , Λ_b , ...
 - Only HPQCD provided FFs for $B_c \rightarrow J/\psi$ and $\Lambda_b \rightarrow \Lambda_c$

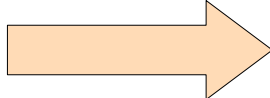


Status of $R(D^*)$ predictions

Most of the SM predictions use fit of theory inputs (mostly LQCD) and experimental data of $B \rightarrow D/D^* \ell \nu$ with light leptons

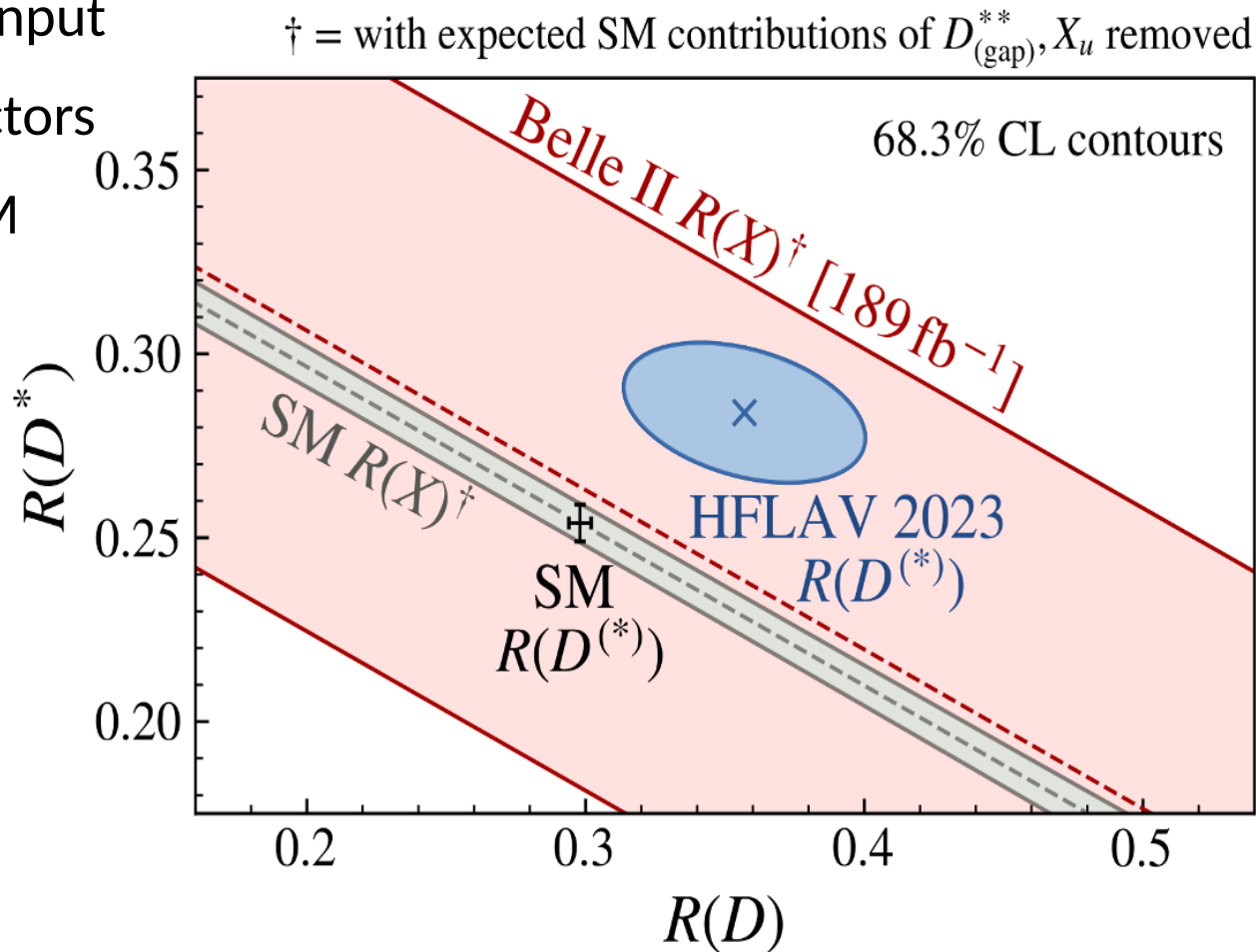


Discussion points: experiment

- Background from $b \rightarrow c \bar{c} q$ decays
 - Major background for LHCb (b-factories?)
 - Need additional measurements (Belle II? And BESIII for D/Ds decays)
- $R(D)-R(D^*)$ with LHCb hadronic tau: need external inputs
 - $B \rightarrow D^* 3\pi$ (and similar for other b-hadrons)
- Commons systematics
 - $B \rightarrow D^{**} / FF$: different treatment between different meas./exp.
 - Assumptions are implied on correlations in combining measurements
- Other observables
 - Angular observables, tau polarization (redo Belle analysis?), try to go differential as much as possible
 - Explore more Inclusive $R(X_c)$ 

Inclusive $R(X_c)$

- New input to LFU
- Very different theoretical input
- ... independent of form factors
- Different sensitivity to BSM



Belle II 2311.07248