Towards precision measurements

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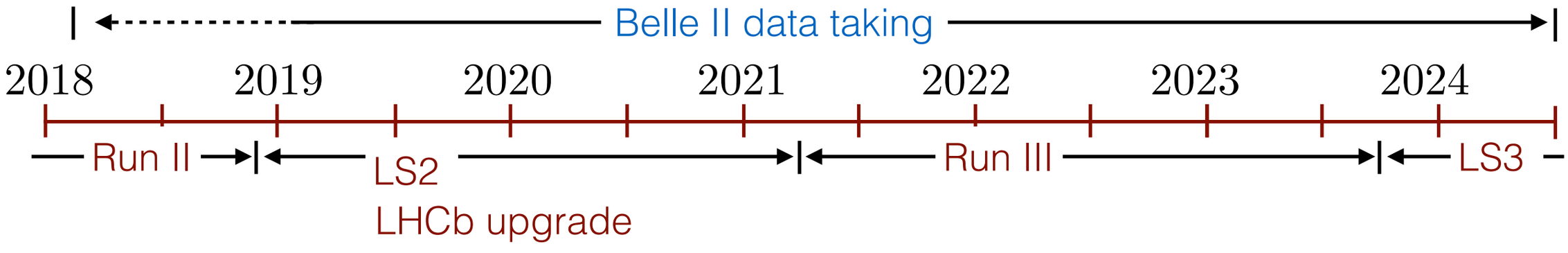
- This morning's session is organised in 3 tracks:
  1. Status of/prospects for measurements at the LHC and Belle/Belle II.
  2. Status of SM calculations.
  3. New ideas for measurements/observables.



Discussion points

- What type of precision could be expected with Belle II / LHCb run II / the LHCb upgrade / ATLAS and CMS?
- What bin size/bin boundaries should we use for the next generation of measurements?
- How close to the narrow charmonium resonances can/should we make measurements?
- How should we treat broader resonances in the experimental analyses?
- What are the dominant sources of systematic uncertainty in the current measurements? What will dominate in the future?
- What can we do with higher-K^* states and baryons?
- What observables should we be measuring?

… and probably a lot more

Branching fraction normalisation

- The LHC experiments typically use $\mathcal{B}(B \to J/\psi K^{(*)})$ from the B-factory experiments to normalise observed rates.
- Dominant systematic uncertainty on our measurements, e.g.

[LHCb, JHEP 12 (2016) 065]

Source	$F_{\rm S}\vert_{644}^{1200}$	$\mathrm{d}\mathcal{B}/\mathrm{d}q^2\ \times 10^{-7}(c^4/\mathrm{GeV}^2)$
Data-simulation differences	0.008–0.013	0.004–0.021
Efficiency model	0.001–0.010	0.001–0.012
S-wave $m_{K\pi}$ model	0.001–0.017	0.001–0.015
$B^0 \to K^*(892)^0$ form factors	–	0.003–0.017
$\mathcal{B}(B^0 \to J/\psi(\to \mu^+\mu^-)K^{*0})$	–	0.025–0.079

- Is it possible to improve the precision on these normalisation modes with Belle II?
- Could you use a partial/full reconstruction of the other *B* to avoid isospin assumptions in $\Upsilon(4S) \to \{B^+B^-, B^0\bar{B}^0\}$.