



# Sensitivity studies on the lepton universality in the channel $\Upsilon(nS) \rightarrow \ell\ell$ via initial-state radiation

Gian Luca Pinna Angioni, Umberto Tamponi

## Abstract

1            In this note we present the results of sensitivity studies on the lepton universality  
2            in the channel  $\Upsilon(nS) \rightarrow \ell\ell$  via initial-state radiation (ISR). The study is performed  
3            with Phase III Monte Carlo samples and cover an integrated luminosity range up to  
4            the design value of  $50 \text{ ab}^{-1}$ . This work show that the even with the complete design  
5            dataset the statistical uncertainty is not reduced enough to have a competitive  
6            measurement.

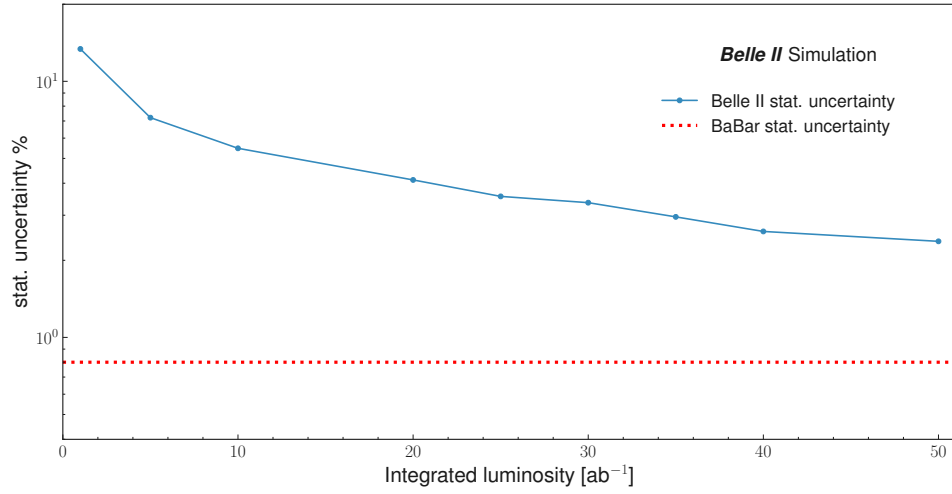


Figure 1: Projection of statistical uncertainty on the cross section of  $e^+e^- \rightarrow \gamma_{ISR} (\Upsilon(1S) \rightarrow \tau\tau)$  as a function of the integrated luminosity. The dashed red line shows the statistical uncertainty of the competitive analysis from BaBar [1].

## 7 References

- 8 [1] J. P. Lees et al. “Precision Measurement of the Ratio  $\mathcal{B}(\Upsilon(3S) \rightarrow \tau^+\tau^-)/\mathcal{B}(\Upsilon(3S) \rightarrow$   
9  $\mu^+\mu^-)$ ”. In: *Phys. Rev. Lett.* 125 (24 Dec. 2020), p. 241801. DOI: 10.1103/PhysRevLett.  
10 125.241801. URL: [https://link.aps.org/doi/10.1103/PhysRevLett.125.](https://link.aps.org/doi/10.1103/PhysRevLett.125.241801)  
11 241801.