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## Inclusive rare $\Lambda_b$ decays to photon

*Tuesday, 18 June 2024 15:50 (20 minutes)*

I present an analysis of the inclusive  $H_b \rightarrow X_s \gamma$  decay with  $H_b$  a beauty baryon, in particular  $\Lambda_b$ , employing an expansion in the heavy quark mass at  $\mathcal{O}(m_b^{-3})$  at leading order in  $\alpha_s$ .

For a polarized baryon I show the results for the distribution  $\frac{d^2\Gamma}{dy d\cos\theta_P}$ , with  $y = 2E_\gamma/m_b$ ,  $E_\gamma$  the photon energy and  $\theta_P$  the angle between the baryon spin vector and the photon momentum in the  $H_b$  rest-frame.

I discuss the correlation between the baryon spin and the photon polarization, and show how effects of physics beyond the Standard Model can modify the photon polarization asymmetry.

I also present a method to treat the singular terms in the photon energy distribution.

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