Lepton-U documentation

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1 General and random considerations

What do we know about the $\Lambda_b \to pKl^+l^-$ beasts ?

- $\Lambda_b \to J/\psi(\mu^+\mu^+)pK$ observed. Used to measure the lifetime of Λ_b this mode is also used for pentaquark studies.

- $\Lambda_b \to \mu^+\mu^+pK$ never observed (work ongoing P.Griffith and co).

- $\Lambda_b \to J/\psi(e^+e^-)pK$ never observed.

- $\Lambda_b \to e^+e^-pK$ never observed.

- $\Lambda_b \to \gamma(e^+e^-)pK$ never observed.

What do we want to do :

- Measure the lepton universality in $\Lambda_b \to pKl^+l^-$, let's call it R_{Λ^*}

- Measure Branching ratio of $\Lambda_b \to pK\gamma$ with conversions.

Back of the envelope Calculation of the expected yields :

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2 samples

3 Stripping selection

For the preliminary studies, data processed with `Stripping 21`, `Reco 14` were used. In `Stripping 21` the `Bu2LLK` stripping line selects the following final states : $K, K*^*, \phi$. So we added in `S21r0,1p1`[1]$\Lambda, \Lambda^*(\to pK), K_S$ etc.

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[1]incremental stripping of Run I data

Sample	Event Type	Information	Processed
$\Lambda_b \rightarrow \Lambda(1520)e^+e^-$	15124001	Sim08 ?	476 221
$\Lambda_b \rightarrow pKe^+e^-$	15124011	Sim08 ?	497 919
$\Lambda_b \rightarrow J/\psi(e^+e^-)pK$	15154001	Sim08 ?	1 214 792
$\Lambda_b \rightarrow \Lambda(1520)\gamma$	15102201	Sim08 ?	383 997
$B_s \rightarrow \phi\gamma$	13102201	Sim08 ?	3 039 979
$B^0 \rightarrow K^*\gamma$	11102201	Sim08 ?	3 027 980
$B^0 \rightarrow K^*(e^+e^-)$	11124001	Sim08 ?	1 272 496

Table 1: Monte Carlo samples - 2012

4 Offline Selection

4.1 BDT Selection

Variables	Importance

Table 2: Variables used in the BDT.

4.2 PID Selection