Current Status of $K^+ \rightarrow \pi^0\mu^+\nu\mu\gamma$ study

FUJIWARA, Tsunehiro
Department of Physics, Kyoto University
fujiwara@scphys.kyoto-u.ac.jp

CONTENTS:
★ adds/corrections
★ background estimation
★ summary
Incomplete treatment in NREG4 case, sometimes, trigger “Signal 8 error” (floating point exception) in generating ntuples. “Signal 8” cause fatal-stop. The runs, in which “signal 8” error occurs, are not used in later analysis. So this bug reduced effective KB_L (and more serious in full sample case).

This bug is already fixed. Both of 1/3 and full sample are now free from this problem.

But ...
KB_LIVE counting method is bash-oneliner such as follows:

```bash
$ for i in $(gawk '{print $3;}' chain12.kumac) ;
  do a=${i%%gamma3*} ; b=${i##nt*/};c=${a}../log/${b} ;
    d=${c%%.nt*}.klog ; grep KB_L $d ; done
| grep -v KB_L_ECL | ~/s.pl - 5
```

In full sample analysis, ntuple-splitting often occurs. Double/triple counting occur in some runs. It happened that KB_LIVE of full sample is about 30% larger than that of 1/3. This cause misunderstanding:

“1/3 sample is still bug-version ??”
## Background summary (revised)

<table>
<thead>
<tr>
<th>sources</th>
<th>1/3 #events</th>
<th>full #events</th>
</tr>
</thead>
<tbody>
<tr>
<td>$K_{\pi 3}(BV/ PV/ OVP)$</td>
<td>1.39</td>
<td>3.97</td>
</tr>
<tr>
<td>$K_{\mu 3} + Acc$</td>
<td>1.33</td>
<td>7.33</td>
</tr>
<tr>
<td>$K_{e 3}/K_{e 3\gamma}$</td>
<td>0.15</td>
<td>0.20</td>
</tr>
<tr>
<td>$K_{\pi 2\gamma}$</td>
<td>&lt; 0.23</td>
<td>&lt; 0.69</td>
</tr>
<tr>
<td>$K_{\mu 3} + splitted \gamma$</td>
<td>&lt; 0.55</td>
<td>&lt; 1.65</td>
</tr>
<tr>
<td>All Backgrounds</td>
<td>2.87 + &lt;0.8</td>
<td>11.7 + &lt;2.3</td>
</tr>
<tr>
<td>$K_{\mu 3\gamma}$</td>
<td>9.9</td>
<td>29.7</td>
</tr>
</tbody>
</table>
Background estimation is consistent between 1/3 and full sample. Miscellaneous distribution checks are now ongoing. If no problem, branching ratio will be obtained soon.