TKR noise study with FSW data

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Outline

- Overall average noise strip occupancy and layer-OR occupancy
- Long term trend
- New noise-flare layers
- Long term activity of noise flares
- TOT of noise events
- Summary and future prospect
Average Noise Occupancy

- Noise occupancy derived from the cosmic-ray trigger data
  - Periodic-trigger is not always available in the FSW data.
- Average of all 70x and 71x run data (listed in the table).

Strip Occupancy

Layer-OR Occupancy

LAT requirement: Occupancy < 5x10^-5

LAT requirement: Occupancy < 0.08

The LAT requirements are well satisfied in the overall time average
Long Term Trend of Noise Occupancy

Noise Occupancy of each runs averaged per tower

January 06 muon-run data

LAT requirement: $5 \times 10^{-5}$

LAT requirement (< $5 \times 10^{-5}$) is well satisfied.

Large-variability towers are not same between January 06 and April 06.

The large variability comes from a couple of marginal noisy strips or intermittent noise flares.
Noise Flare

- Layers with noise flares
  - January 2006
    - Bay2 Y8, Bay7 Y14, Bay10 X17, Bay15 X11
  - April 2006
    - Bay2 Y8, Bay7 Y14, Bay10 X17, Bay15 X11
    - Bay7 X14, Bay10 Y4, Bay12 Y5, Bay14, Y0 (New)
  - 4 new flare layers appeared.

- Example of noise strip profile of new flare layers

![Example of noise strip profile of new flare layers](image_url)
Long Term Activity of Noise Flare

Flare layers seen in January
Bay2 Y8
Bay7 Y14
Bay10 X17
Bay15 X11

New Flare Layers
Bay7 X14
Bay10 Y4
Bay12 Y5
Bay14, Y0

Something might happen in April 24th (113th day from 1/1).
TOT of noise events

Short-TOT noise

- Short noise → High trigger frequency
- Long noise → Long dead time for trigger signal

Trigger mask criteria will have to be considered separately.

Combination of short and long noise
Summary and Future Prospect

- TKR noise of the data taken with FSW were studied. It is well under the requirement.
- New noise-flare layers were found. We keep monitoring the noise flare behavior in the environmental test at NRL.
- Two kinds of noisy strips with an excess of long-TOT noise or short-TOT noise are found. It will have to be taken care of when we determine the trigger mask.

- I will soon update the TkrNoiseOcc module in a program for SVAC ntuple.
- TKR trigger efficiency will also be done soon.