Analysis of $^{85}$Kr concentration in KamLAND with rollback technique

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- trigger efficiency  
  - rollback window length (longer is better)  
  - trigger threshold (lower is better)  
  - data flow, grows with efficiency (lower is better)

Multiply balanced

- trigger efficiency
- rollback window length (longer is better)
- trigger threshold (lower is better)
- data flow, grows with efficiency (lower is better)

MoGURA Electronics

- 100 μs buffer  
  - programmable trigger logic

Efficiency against Flow for Different Rollback Windows

- 0.1 μs
- 0.2 μs
- 0.5 μs
- 1.0 μs
- 2.0 μs
- 3.0 μs
- 4.0 μs
- 5.0 μs
- 8.0 μs

Lowest threshold & highest efficiency

Data Flow

- prompt vs distribution  
- delayed vs distribution

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- delayed vs distribution

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- delayed vs distribution

Prompt event  
Delayed event

Balance

- applied after a cut based on median absolute deviation  
- $K=2$  
- $O(n^2)$

K-means 1D

Impact on $^7$Be solar $\nu$ uncertainty

- $^7$Be solar $\nu$  
- $^7$Kr

Comparison of Spectra

- $^7$Be electron recoil  
- $^{85}$Kr major branch

Level diagram for $^{85}$Kr

- Nuclear Fusion Reaction  
- CNO-cycle  
- $1.5\%$

Hep + $^{85}$Kr → $^{85}$Rb  
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- $^{85}$Kr (K-12)

Neutrino Spectrum (±10)

- $^{85}$Kr (K-12)

Flux (antineutrinos$\cdot$m$^2\cdot$year$^{-1}$)  
Neutrino Energy [MeV]