Methods description:

Method 1 (strip level removal).

- For each APV, check if it has neighboring channels.
- If found neighboring channels, see if one channel ADC < 1/8 the other channel ADC.
- If true, discard the small ADC channel. If false, leave it.

Method 2 (cluster level removal). ✓

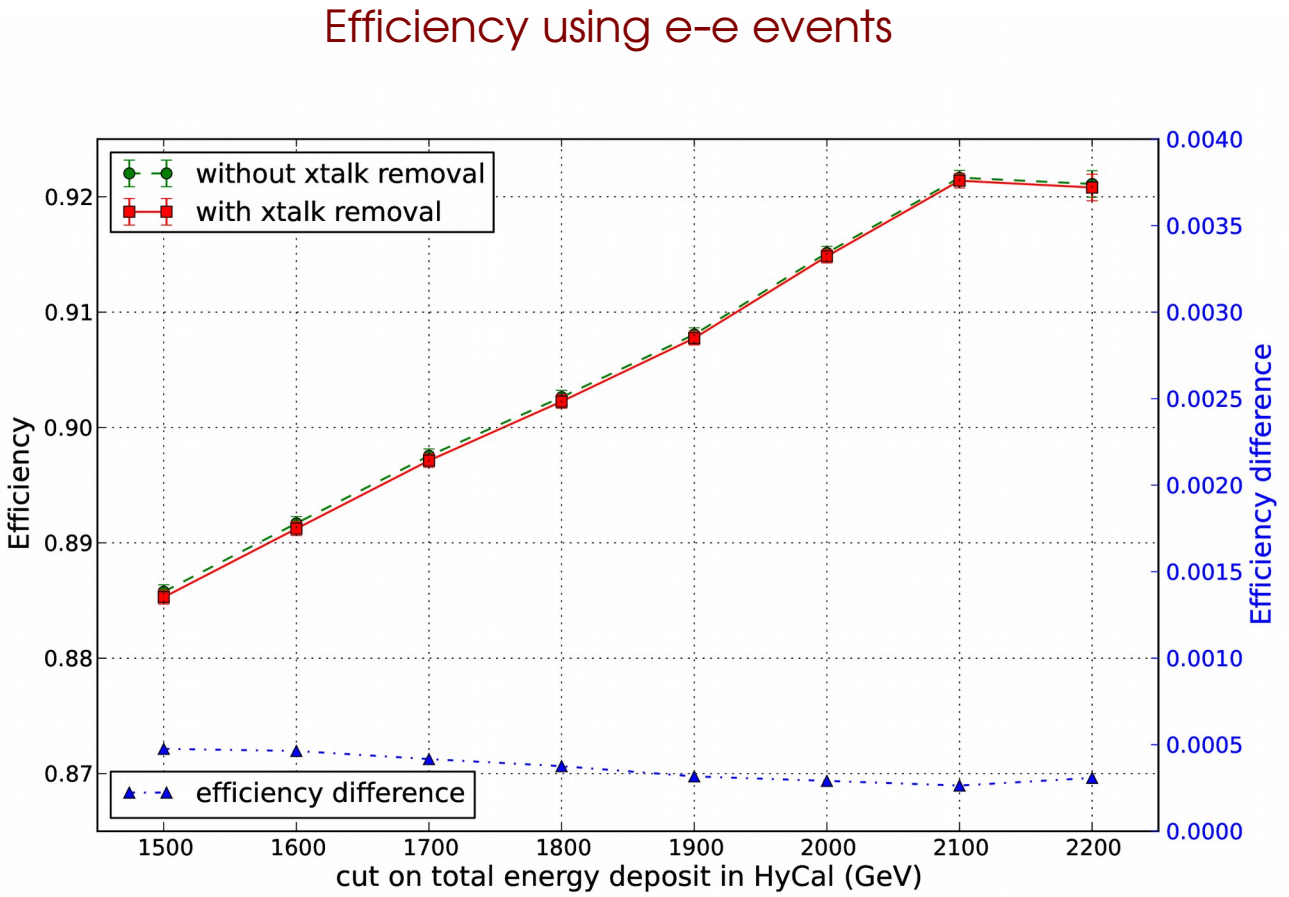
- Using the same methodology to find cross-talk strips (APV chip level). No removal in this step.
- For each strip, set a flag. (cross-talk strip: flag=1, non-cross-talk strip: flag=0).
- Use all strips to construct clusters.
- For each cluster, set two flags, has_cross_talk_strip and has_normal_strip.
- If found normal strip inside cluster: has_normal_strip=1, if found cross-talk strip inside cluster: has_cross_talk_strip=1.
- Remove clusters (1): with has_normal_strip=0 AND has_cross_talk_strip=1, AND (2): has characteristic distance. <at a characteristic distance away, exists another accompany cluster (inducer)>.

Cross-talk removal effect on production efficiency

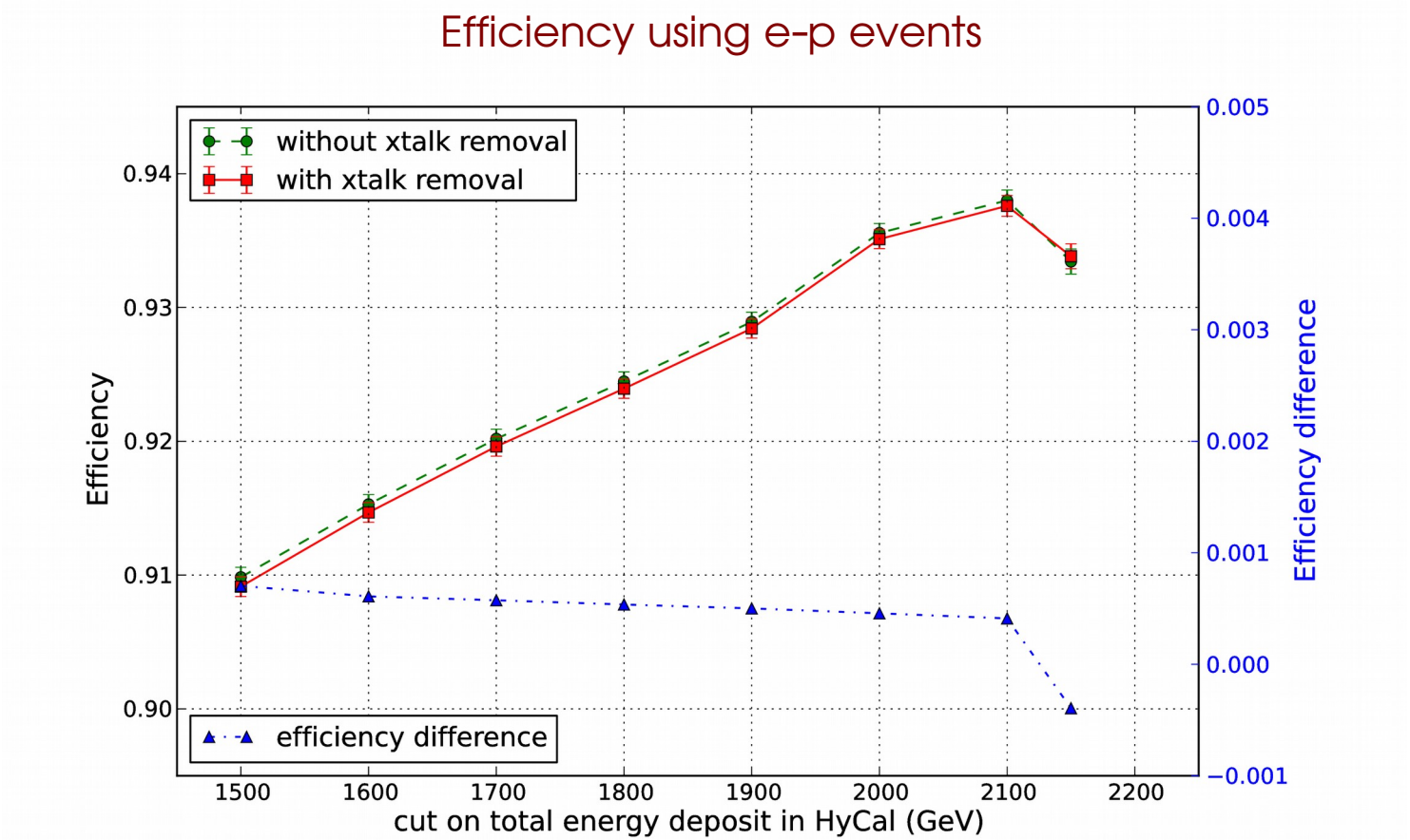
- Beam energy: 2.2 GeV
- Moller event cut:

  1), require 2 clusters, after matching
  2), total energy > a set value (x-axis scan)

- Red line: Efficiency after cross-talk removal
- Green line: Efficiency before cross-talk removal
- Blue line: red line – green line
- X-axis: total energy deposit in HyCal.



Cross-talk removal effect on production efficiency



E-p event cut:

Only one cluster in this event, and cluster energy > a set value (energy deposit cut)

X-axis: cut on total energy deposit in HyCal

Bottom Triangle: (red – green) / green in percentage

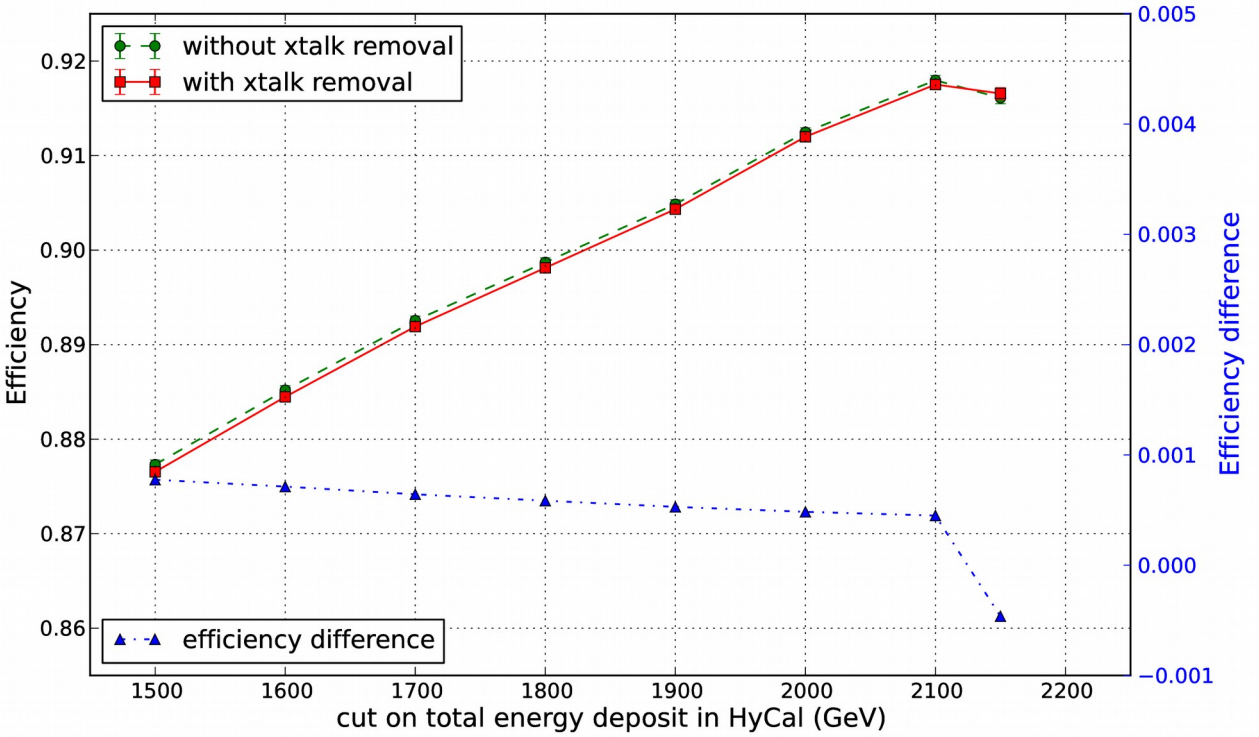
Cross-talk removal effect on production efficiency

Efficiency with no event type cut, includes everything

- Beam energy: 2.2 GeV
- No Event type cut

  1), require >=1 clusters, after matching
  2), total energy > a set value (x-axis scan)

- Red line: Efficiency after cross-talk removal
- Green line: Efficiency before cross-talk removal
- Blue line: red line – green line
- X-axis: total energy deposit in HyCal.



Summary

- Clusters cut away:

  chamber 1 X plane: 6.6% cut away.
  Chamber 1 Y plane: 3.3% cut away.
  Chamber 2 X plane: 6.6% cut away.
  Chamber 2 Y plane: 10.9% cut away.

- Cross-talk removal effect on efficiency: ~ within error.