Simulation of BES Trigger

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1 Motivation

- Trigger study
  Suppress background more, study configurations of trigger table and their effects
- No trigger information in M.C. data
  Output trigger conditions by simulation and have no effects on M.C. event output
- Trigger efficiency by simulation
  Give the efficiencies of trigger system for different event types directly from M.C. data

2 Simulation and Verification

- Trigger frame
  Figure 1
- Simulation flow chart
  Figure 2
- Verification
  Figure 3 and figure 4
  J/ data: RUN11991
  Hadron, bhabha, dimu and neutral events

- Conclusion:
  This program could simulate trigger effectively.

3 Trigger efficiency measurement by simulation

- Method
  First, M.C. generator creates an event type set. Then this set is processed and selected by offline and a set is output in which the number of selected events is assumed as N. At last , the selected set is accessed through trigger simulation and a new set is output in which all events, assumed as M, are passed the trigger decision. The value of N/M is called as trigger efficiency for this event type.

- Result
  Figure 5

- Conclusion:
  The trigger efficiency given from M.C. data is consistent with that measure method. It proves that the trigger satify the BES datataking, could make up the support the trigger study in future.

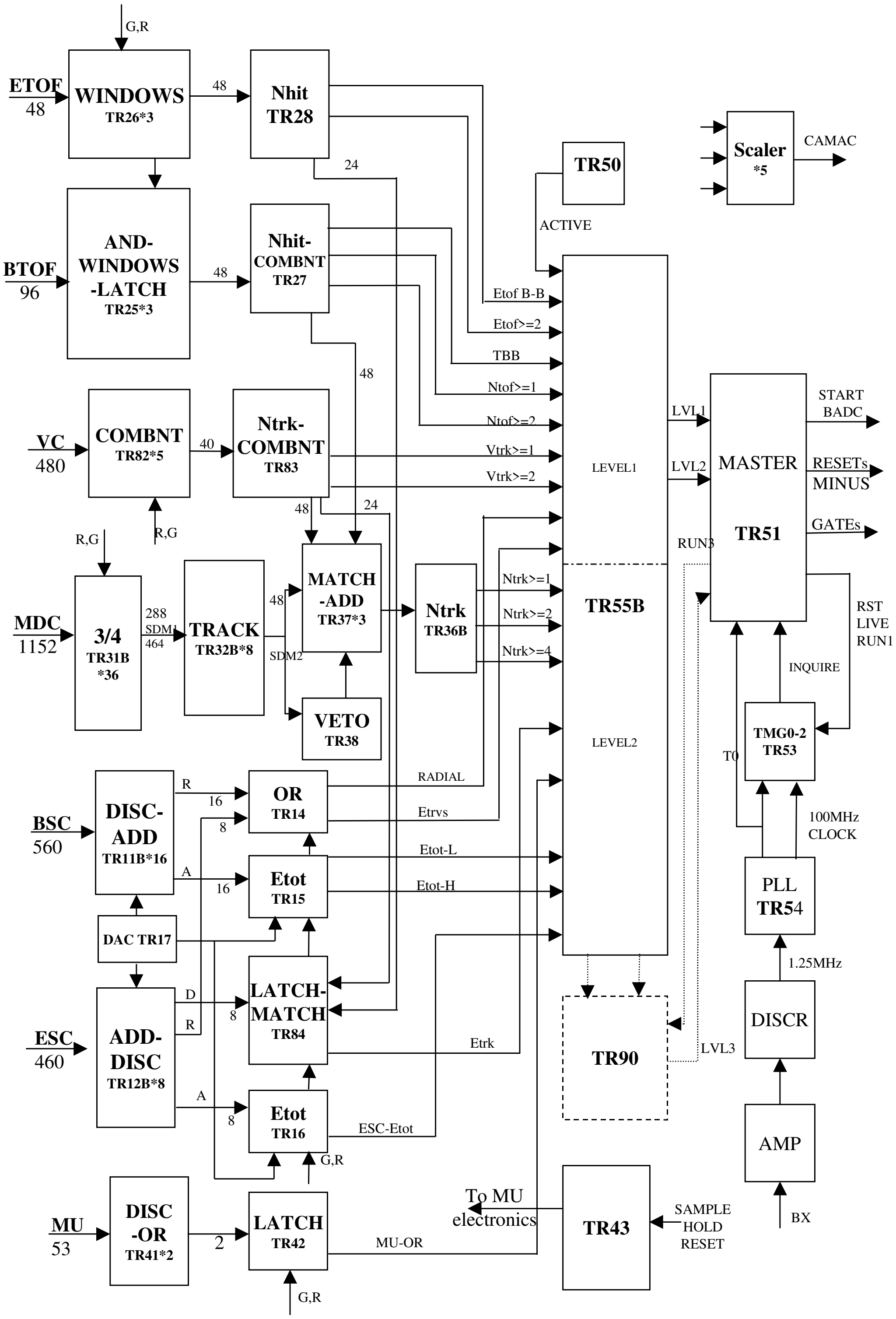


Figure 1: BES Trigger Frame

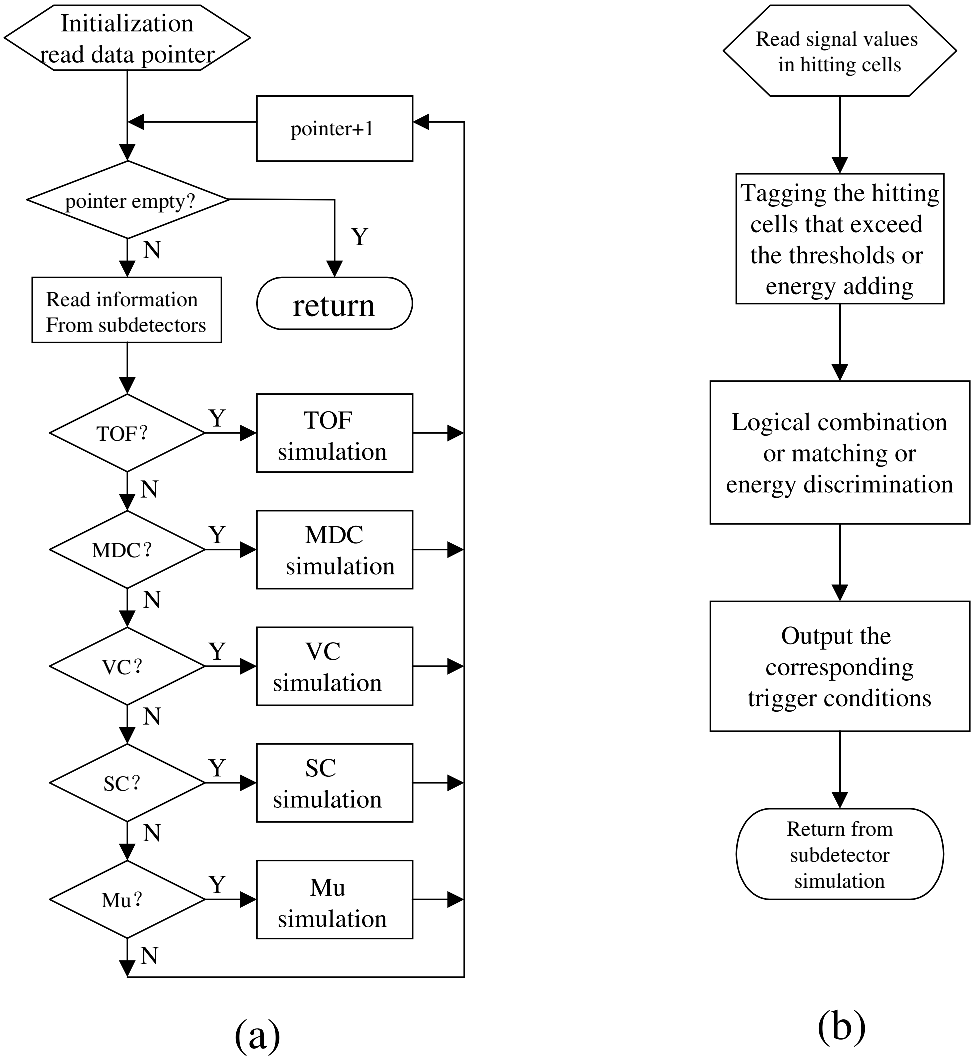


Figure 2: Trigger Simulation Flow Chart

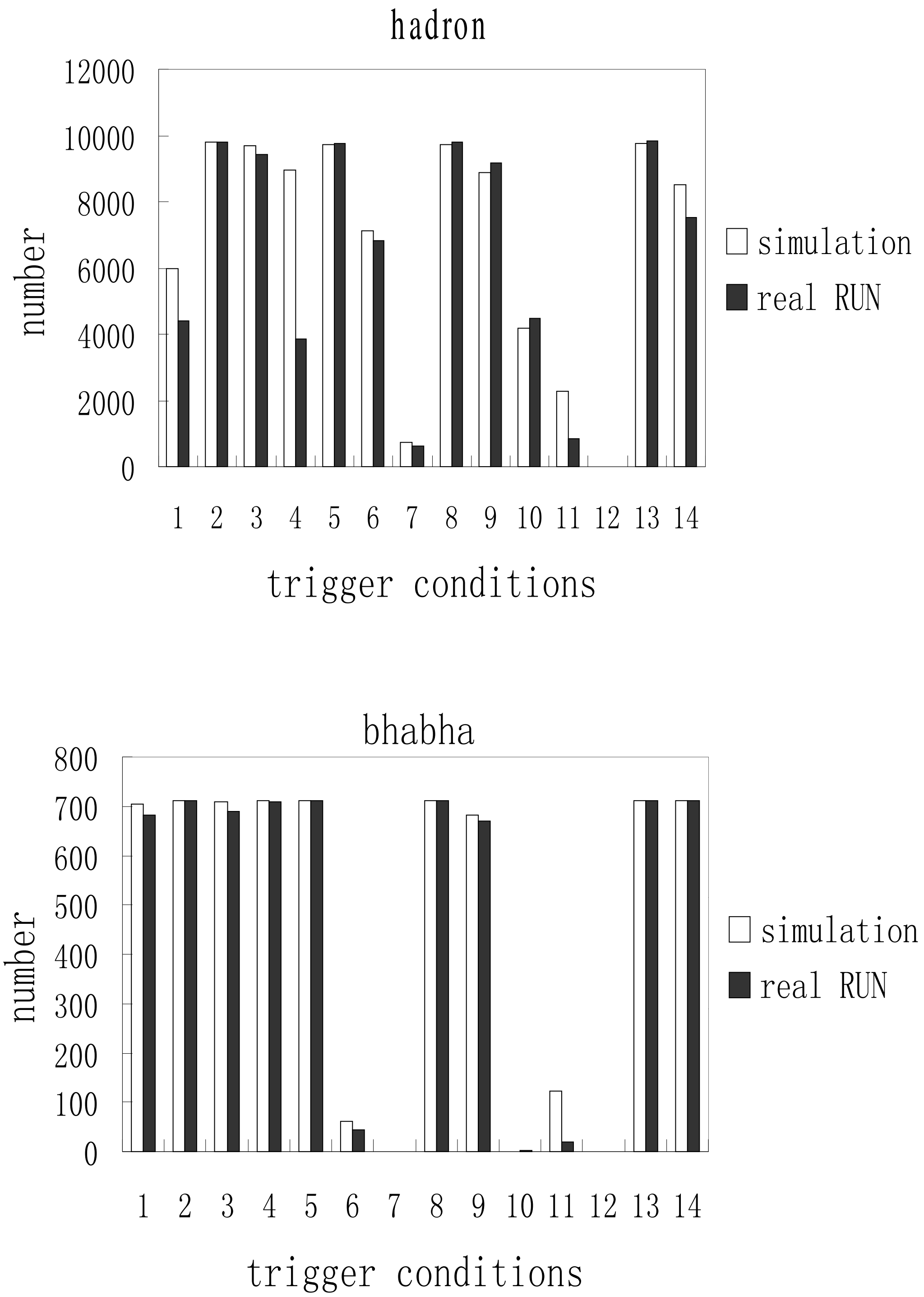
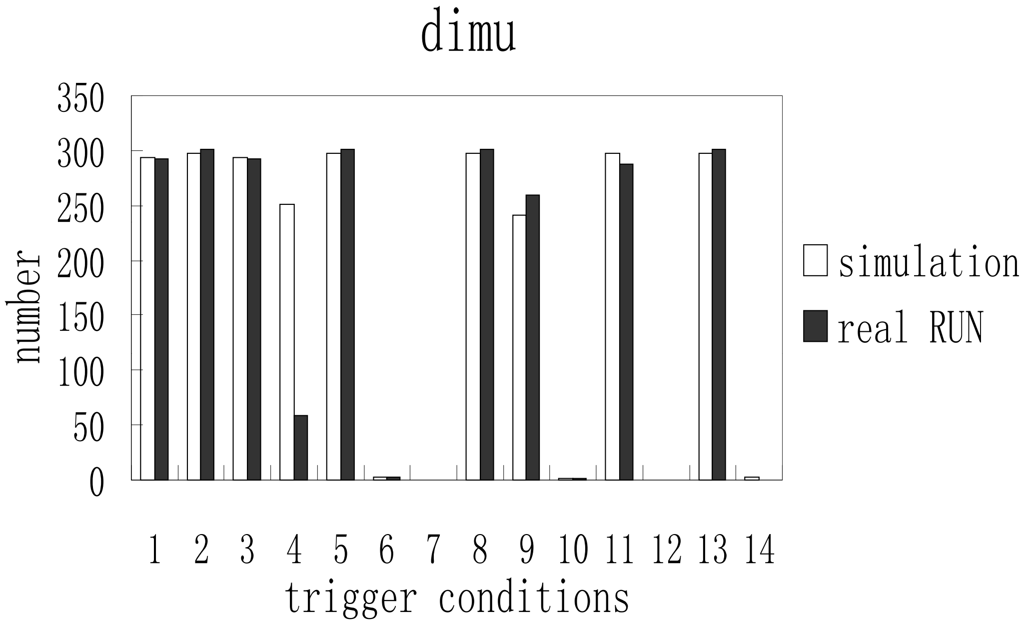


Figure 3: Trigger conditions' comparison between simulation and real RUN (a)



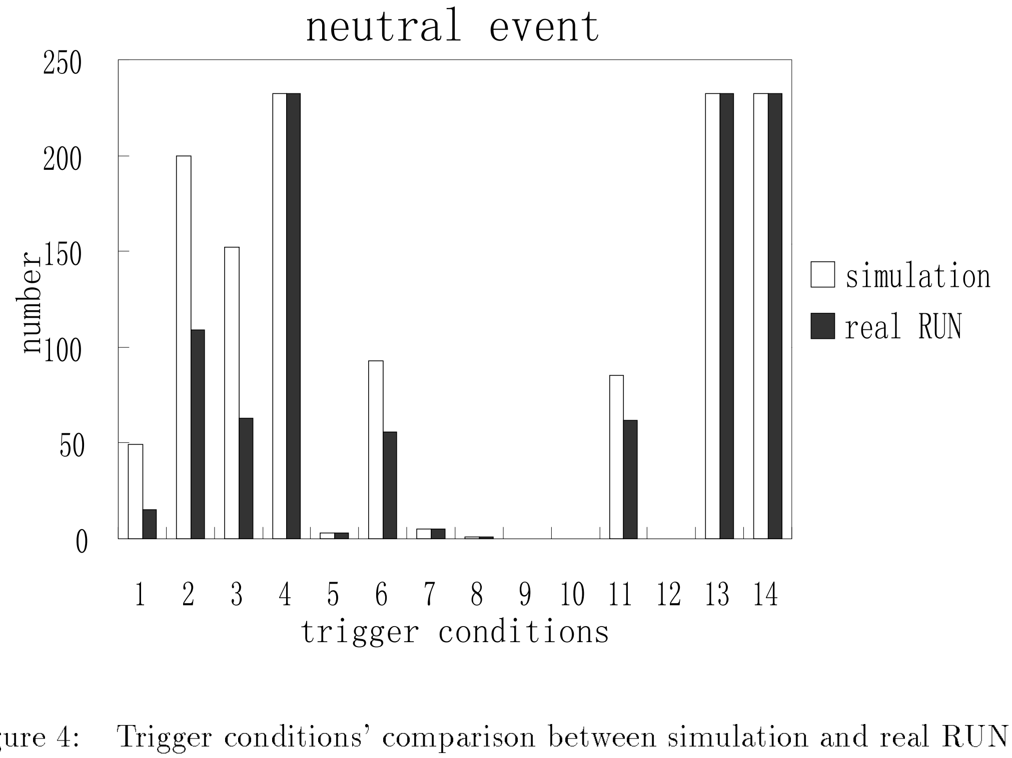


Figure 4: Trigger conditions' comparison between simulation and real RUN (b)

Item / Event type	Events ***Generated By M.C. Generator***	Events ***Passing Offline Selection***	Selected Events ***Passing Trigger Decision***	Trigger Efficiency ***By Simulation*** **(%)**
hadron	29389	21121	21076	99.8
bhabha	5000	2900	2900	100
dimu	5000	1949	1949	100
neutral	10534	1256	1256	100

Figure 5: Trigger efficiencies for different event types by simualtion