V0 Trigger Configuration

#BBAFlags – total number of V0A discriminator flags (amplified signal above threshold) inside beam-beam timing windows
#BBCFlags – total number of V0C discriminator flags (amplified signal above threshold) inside beam-beam timing windows
#BGAFlags – total number of V0A discriminator flags (amplified signal above threshold) inside beam-gas timing windows
#BGCFlags – total number of V0C discriminator flags (amplified signal above threshold) inside beam-gas timing windows
ChargeV0A – total V0A charge recorded by ADC (for technical reason innermost ring is excluded)
ChargeV0C – total V0C charge recorded by ADC

V0 Trigger configuration in Run1

Triggers (order by bits) :

0. #BBAFlags ≥ BBAThreshold & #BBCFlags ≥ BBCThreshold (V0AND)
1. #BBAFlags ≥ BBAThreshold | #BBCFlags ≥ BBCThreshold (V0OR)
2. #BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCForBGThreshold
3. #BGAFlags ≥ BGAThreshold (0VGA)
4. #BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAForBGThreshold
5. #BGCFlags ≥ BGCThreshold (0VGC)
6. ChargeV0A ≥ CentralityV0AThrLow & ChargeV0C ≥ CentralityV0CThrLow (0VLN)
7. ChargeV0A ≥ CentralityV0AThrLow | ChargeV0C ≥ CentralityV0CThrLow
8. ChargeV0A ≥ CentralityV0AThrHigh & ChargeV0C ≥ CentralityV0CThrHigh (0VHN)
9. ChargeV0A ≥ CentralityV0AThrHigh | ChargeV0C ≥ CentralityV0CThrHigh
10. (MultV0AThrLow ≤ #BBAFlags ≤ MultV0AThrHigh) &
    (MultV0CThrLow ≤ #BBCFlags ≤ MultV0CThrHigh)
11. (MultV0AThrLow ≤ #BBAFlags ≤ MultV0AThrHigh) |
    (MultV0CThrLow ≤ #BBCFlags ≤ MultV0CThrHigh)
12. #BBAFlags ≥ BBAThreshold (0VBA)
13. #BBCFlags ≥ BBCThreshold (0VBC)
14. #BGAFlags ≥ BGAThreshold | #BGCFlags ≥ BGCThreshold
15. (#BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCForBGThreshold) |
    (#BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAForBGThreshold)

V0 Trigger configuration for Run2 (2015)

Red : unchanged wrt Run1
Blue : modified wrt Run1
Green : new

Triggers (order by bits) :

0. #BBAFlags ≥ BBAThreshold & #BBCFlags ≥ BBCThreshold (0VBB)
1. #BBAFlags ≥ BBAThreshold | #BBCFlags ≥ BBCThreshold (0VB0)
2. #BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold (0VXA)
3. #BGAFlags ≥ BGAThreshold (0VGA)
4. #BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold (0VXC)
5. #BGCFlags ≥ BGCThreshold (0VGC)
6. if (CentralityV0CThrLow > 0)
   ChargeV0A ≥ CentralityV0AThrLow & ChargeV0C ≥ CentralityV0CThrLow (0VLN)
   if (CentralityV0CThrLow = 0)
   ChargeV0A+ChargeV0C ≥ CentralityV0AThrLow (0V0M)
7. #BGAFlags ≥ BGAThreshold & #BGCFlags ≥ BGCThreshold (0VGB)
8. if (CentralityV0CThrHigh > 0)
   ChargeV0A ≥ CentralityV0AThrHigh & ChargeV0C ≥ CentralityV0CThrHigh (0VHN)
   if (CentralityV0CThrHigh = 0)
   ChargeV0A+ChargeV0C ≥ CentralityV0AThrHigh (?????)
9. (#BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold) |
   (#BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold) (0VXO)
10. (#BBAFlags ≥ MultV0AThrLow &
    #BBCFlags ≥ MultV0CThrLow &
    #BGAFlags ≤ MultV0AThrHigh &
    #BGCFlags ≤ MultV0CThrHigh) (0VHM)
11. #BBAFlags ≥ BBAForBGThreshold |
    #BBCFlags ≥ BBAForBGThreshold |
    #BGAFlags ≥ BBCForBGThreshold |
    #BGCFlags ≥ BBCForBGThreshold (0VIR)
12. #BBAFlags ≥ BBAThreshold (0VBA)
13. #BBCFlags ≥ BBCThreshold (0VBC)
14. #BGAFlags ≥ BGAThreshold | #BGCFlags ≥ BGCThreshold (0VGO)
15. (#BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold) &
    (#BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold) (0VXB)

List of changes (2015):

Trigger 2 → Change from BBCForBGThreshold to BBCThreshold
Trigger 4 → Change from BBAForBGThreshold to BBAThreshold
Trigger 6 and 8 → Add 'if...else' in order to use CentralityV0CThrLow/High to switch between cut on each side of V0 to the sum of V0A and V0C
Trigger 7 → new, similar to Trigger 14, but does 'AND' instead of 'OR'
Trigger 9 → new, similar to Trigger 15, but BBCForBGThreshold and BBAForBGThreshols changed to BBCThreshold and BBAThreshold
Trigger 10 → MultV0AThrHigh and MultV0CThrHigh are applied on #BGAFlags and #BGCFlags (instead of #BBAFlags and #BBCFlags used in Run1)
Trigger 15 → 'OR' change to 'AND', BBCForBGThreshold and BBAForBGThreshols changed to BBCThreshold and BBAThreshold
Trigger 11 → new (NOTE THE MEANING OF THE REGISTERS!)

V0 Trigger configuration for Run2 (Sep 2018)

Red : unchanged wrt previous version
Blue : modified wrt previsous version
Green : new

Triggers (order by bits) :

0. #BBAFlags ≥ BBAThreshold & #BBCFlags ≥ BBCThreshold (0VBB)
1. #BBAFlags ≥ BBAThreshold | #BBCFlags ≥ BBCThreshold (0VB0)
2. #BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold (0VXA)
3. #BGAFlags ≥ BGAThreshold (0VGA)
4. #BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold (0VXC)
5. #BGCFlags ≥ BGCThreshold (0VGC)
6. ChargeV0A+ChargeV0C ≥ CentralityV0AThrLow (0V0M)
7. ChargeV0A+ChargeV0C ≥ CentralityV0CThrLow &
   ChargeV0A+ChargeV0C ≤ CentralityV0CThrHigh (0VSC)
8. ChargeV0A+ChargeV0C ≥ CentralityV0AThrHigh (0V0H)
9. (#BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold) |
   (#BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold) (0VXO)
10. (#BBAFlags ≥ MultV0AThrLow &
    #BBCFlags ≥ MultV0CThrLow &
    #BGAFlags ≤ MultV0AThrHigh &
    #BGCFlags ≤ MultV0CThrHigh) (0VHM)
11. #BBAFlags ≥ BBAForBGThreshold |
    #BBCFlags ≥ BBAForBGThreshold |
    #BGAFlags ≥ BBCForBGThreshold |
    #BGCFlags ≥ BBCForBGThreshold (0VIR)
12. #BBAFlags ≥ BBAThreshold (0VBA)
13. #BBCFlags ≥ BBCThreshold (0VBC)
14. #BGAFlags ≥ BGAThreshold | #BGCFlags ≥ BGCThreshold (0VGO)
15. (#BGAFlags ≥ BGAThreshold & #BBCFlags ≥ BBCThreshold) &
    (#BGCFlags ≥ BGCThreshold & #BBAFlags ≥ BBAThreshold) (0VXB)

List of changes (Sep 2018):

Trigger 6 → Removed ‘if..else’ used to switch between A,C and A+C charge threshold. Now the trigger works always on the sum of V0A and V0C charges.
Trigger 8 → Removed ‘if..else’ used to switch between A,C and A+C charge threshold. Now the trigger works always on the sum of V0A and V0C charges.
Trigger 7 → Beam-gas trigger (0VGB) replaced by a trigger requiring the A+C charge to be between CentralityV0CThrLow and CentralityV0CThrHigh.