SVD/PXD Hits Issue

PROD1 VS PROD2

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The Issue BIIDP-689

➡ With the first official production (prod1) SVD and PXD hits (but only on one layer!) were attached to tracks. PXD and SVD hits disappeared when data were reprocessed in prod2.

prod1, run112-1162
- release-01-02-02
- GT_gen_data_004.43_gcr2b-reprocessing

prod2, run112-2531
- release-01-02-03
- GT_gen_data_004.51_reprocessing-release-01-02-03
- MagneticFieldPhase2-2018-04
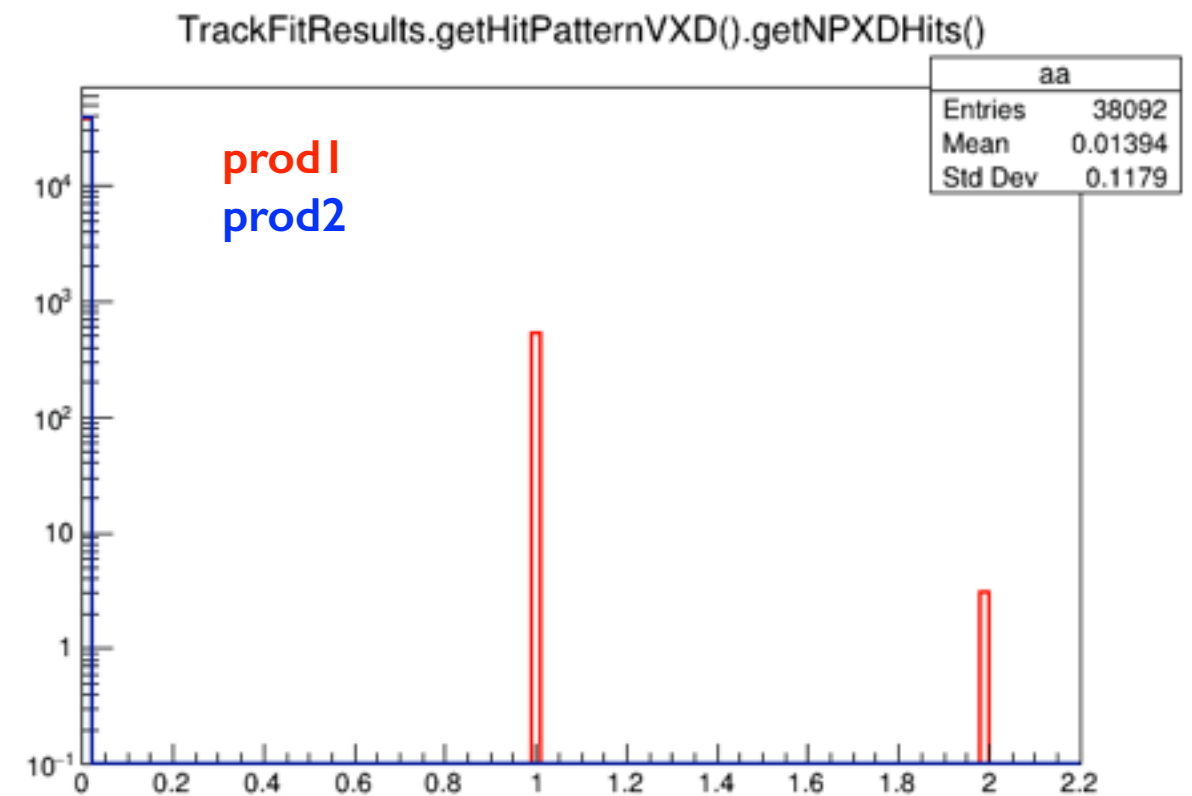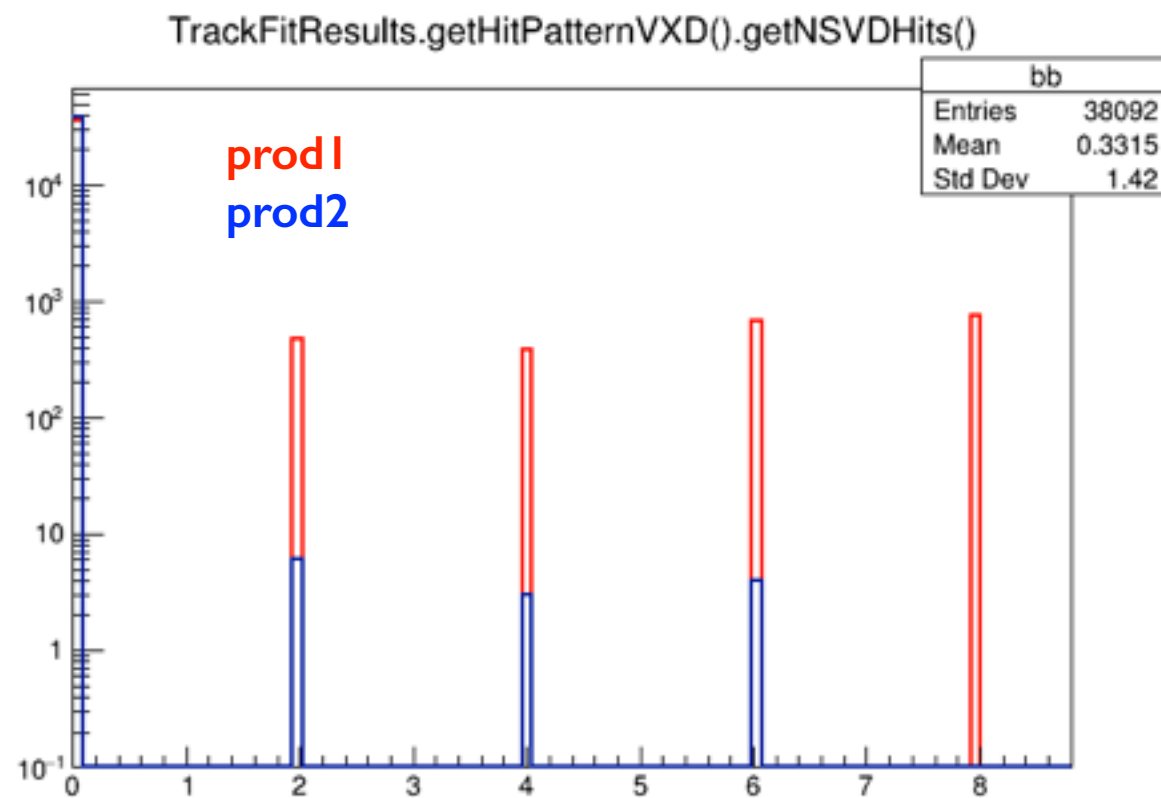
The Bug(s)

➡ For the SVD, we found that the source of the problem was due to the combination of two factors:

1. for prod1 and prod2: the SVDSPacePointCreator module was called 2 times in the reconstruction chain. The first time was wrongly setup: the cut on the SVD hit time was applied at -20 ns (instead the cut should have been to -999 ns)

2. only for prod1: the calibration of the SVD was set as the default one, i.e. the one used to reconstruct MC (GT4.43)

3. only for prod2: the calibration of the SVD was set correctly as the calibration taken during the local runs (GT4.51)
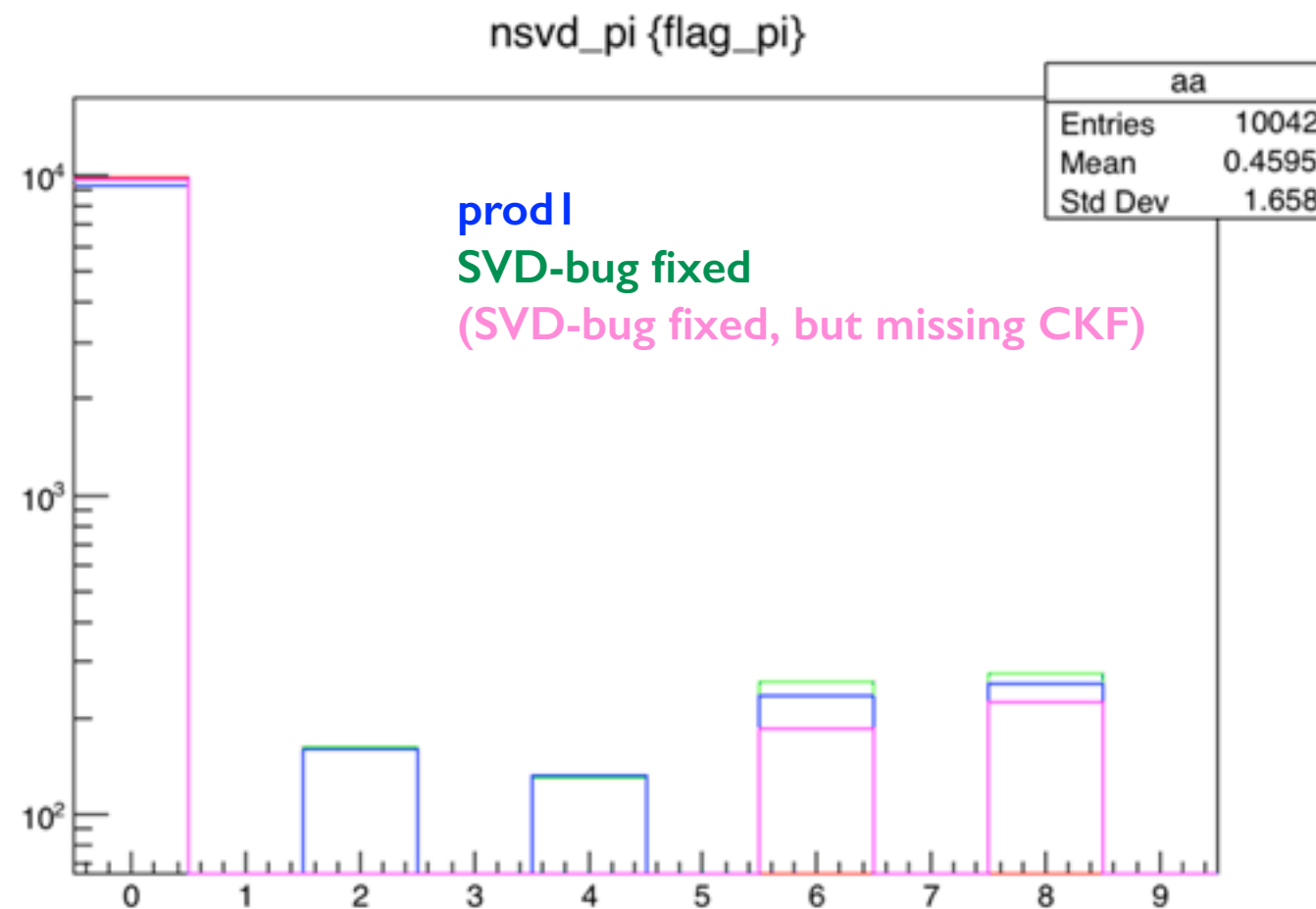
➡ Therefore:

1. In prod1, even if we had the wrong cut on SVD Hit time, the calibration was such that the cut basically did not have any effect

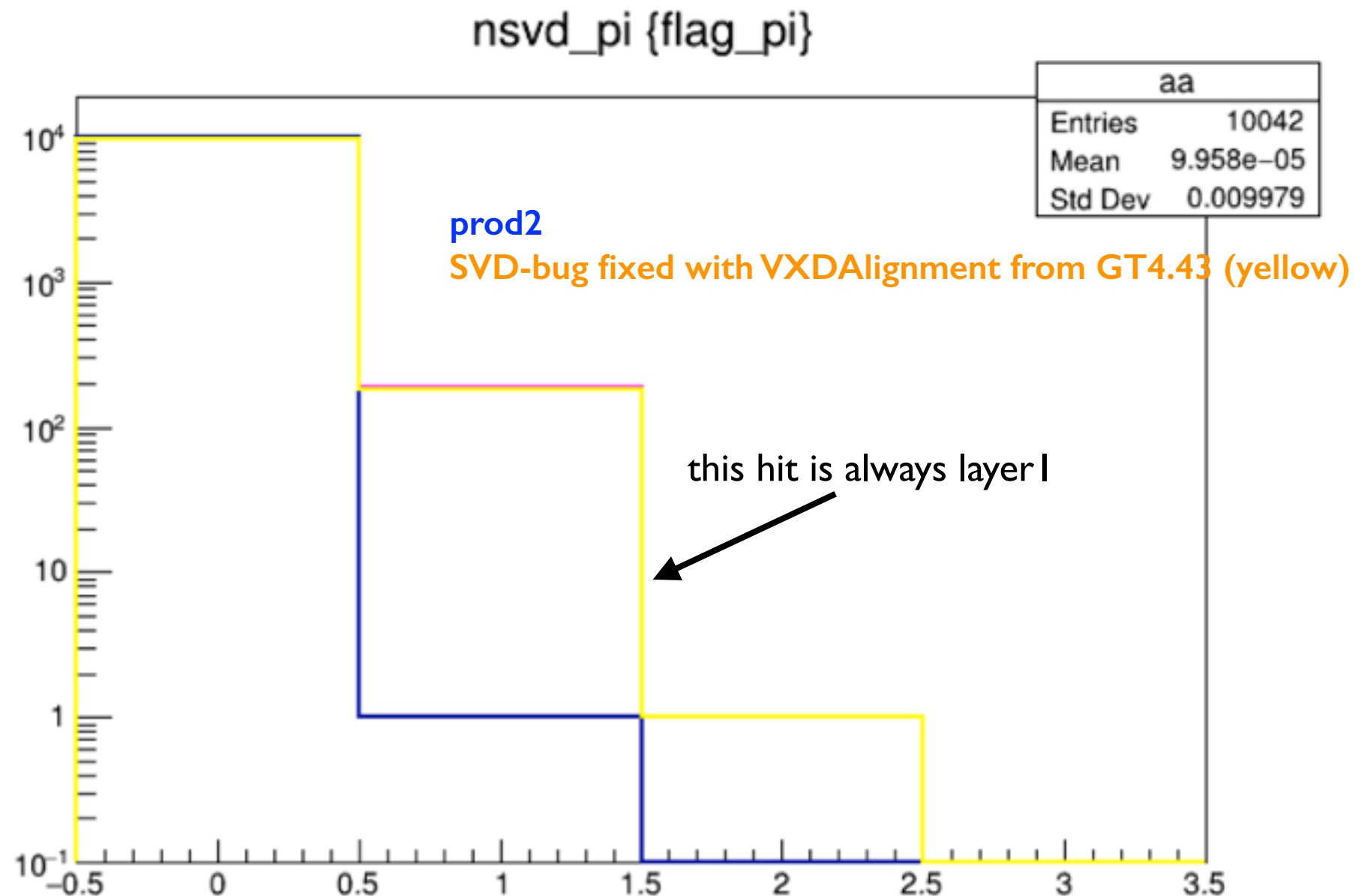2. In prod2, when the calibration has been adjusted, the cut removed a lot of SPs

The SVD Fix

➡ For SVD we fixed the bug in the following way:

1. add the SP creator in the add_svd_reconstruction function, which is called only once in the tracking reconstruction

2. setup the SP creator with the IoVDependentCondition module that changes the cut on the cluster time depending if it's phase2 data reconstruction or not

nsvd_pi {flag_pi}

prod1
SVD-bug fixed
(SVD-bug fixed, but missing CKF)

aa	
Entries	10042
Mean	0.4595
Std Dev	1.658

PXD

➡ The bug fix affected only SVD, in fact the fix only fixed SVD hits (fixed means: same as prod1).

➡ In addition, in order to recover PXD hits as prod1 we had to revert the VXDAlignment payload to the one used in GT used for prod1 (GT4.43)

nsvd_pi {flag_pi}

prod2
SVD-bug fixed with VXDAlignment from GT4.43 (yellow)

aa	
Entries	10042
Mean	9.958e−05
Std Dev	0.009979

this hit is always layer1

Conclusions

➡ The SVD part of the bug was solved and the bug-fix was merged to release-01-02-06

- we need to fix it also for release-02-00-00 and for the master

➡ The PXD hit distribution does not look right

- apparently the track have only hits on the innermost layer of PXD

- the problem seems different than the one solved for SVD: PXDSpacePointCreator is added only once to the chain

- the effect of the alignment constants is not understood. The alignment should have been better with the GT of prod2 than the GT of prod1