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Status of VXDTF-related modules

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What happened since last time (jan2014)?

Been there, done that:

Overview

- Finished working on the beam test issues
- Supervising Bachelor student Thomas Fabian TF-Filter review
- Supervising Project student Stefan Ferstl TF-display output and debug info collector
- Study about the behavior of the VXDTF for cases with and without background
- Bugfixes (as always)
- Started redesign of the VXDTF



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Beam Test at Desy Hamburg - January 2014

Track finding was possible

- Online support for 4-layer SVD-Tracking
 - First contact with real sensors and realistic alignment
 - Fast enough for the mini HLT (< 200 $\mu s/event)$
 - Worked with and without magnetic field
 - Issues with L3, very bad efficiency (alignment? unknown VXDTF-error?)
- For off-line: Support for SVD, PXD and TelClusters, please use:
 - Use VXDTF for normal tracking and TB too (example files for more details)
 - Use BaseLineTF (testbeam package) for minimalistic track finding for TB cases



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Progress with supervised students

- Thomas Fabian:
 - Complete check for filters used for the VXDTF
 - Now (partially) automated report generation for the analysis of filters for given run/setup
 - Extremely slow (3 hours for 400 events calculations done in C++, Python and R), but very helpful
 - most relevant new insight 1 all filters work as expected
 - most relevant new insight 2 filters are *not* the cause for the drop of efficiency at $\theta \approx 90^{\circ}$
- Stefan Ferstl:
 - Implemented an interface for internal VXDTF-Logging with output for analysis tools and display module
 - Work basically completed, currently waiting for write-up



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• $p_{\rm T} = 250 \, MeV/c$, realistic Clusters and Background

Example for result of $60^{\circ} \le \theta \le 70^{\circ}$:

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Typical event w/o BG



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Time consumption of each relevant part of the TF - normalized to 1 = median (median vs mean)



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Efficiency vs momentum





Efficiency vs theta



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Redesign general issues end/backup



Just a few remarks

- 20500+5000 bare lines of VXDTF-related C++-code (counted without comments and empty lines)
- SpacePoints are ready to be given to Andrzey Bozeks' Team
- The VXDTFModule is now frozen in its interface, can safely be used
- Work is done in the TFRedesignModule which will change names after redesign is done
- ٠ No immediate performance improvements should be expected right after finishing redesign
- Still ongoing



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Things you should keep in mind when using VXDTF

- Currently there is an issue causing low efficiency for the VXDTF in the PXD:
 - Seems to be independent from Clusterizer
 - Some tuning changes for setup did not help
 - Likely cause: sectorMaps currently used are not good (time consuming recalculation needed not guaranteed that this was the cause)
 - Problem will be adressed after redesign
- Some severe bugs were removed from the VXDTF not so long ago, therefore please use current versions of the code:
 - monthly build 2014-10-01 will contain the fixes mentioned here
 - r12481 or newer contain the fix for efficiency (except the PXD-problems mentioned above)
 - r12875 or newer contain all fixes relevant so far including most of nondeterministic behavior









Current state of this part of the reconstruction chain



[!!!] : shortcut for "a lot of important stuff which is not part of this discussion"

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Future state of the trackFinder VXD-approach (event-part)





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