Status of the BDC reconstruction

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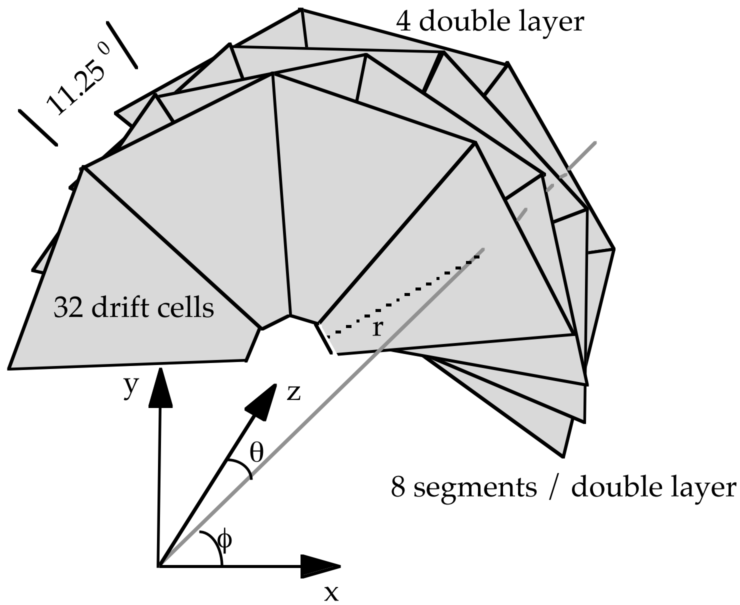
- **Introduction**
- **Status of HDREC**
- **Task list to improve the BDC reconstruction**

Introduction

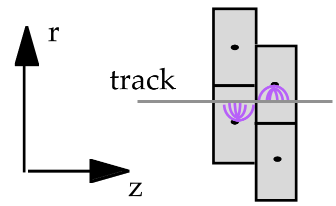
- BDC is in operation since 95
- BDC reconstruction software was written by B. Schwab and M. Werner
- For the 95 running period 2 PhD thesis covered the performance of the chamber (B. Schwab) as well as F_2 measurement related tasks (J. Katzy)
- Information on BDC related tasks
  http://www-h1.desy.de/~marks/bdc/bdc.html

Backward Drift Chamber

BDC schematic view:



drift cells in a double layer:



16 cells, $L_D = 1.524$ cm
16 cells, $L_D = 0.508$ cm

Some parameters:

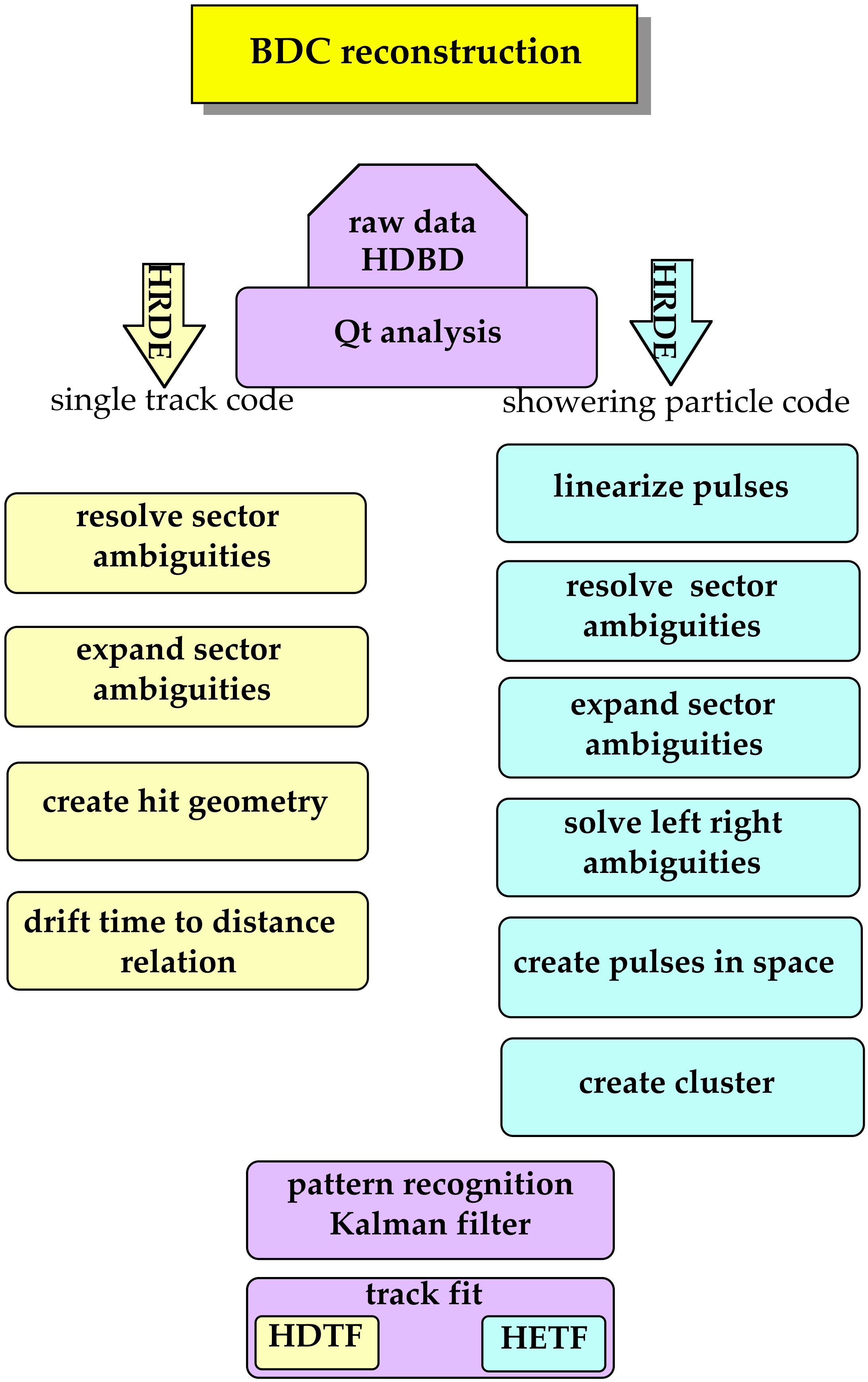
gas mixture:	92.5% Ar / 5.0 % Isobutan / 2.5 % NH_3
drift velocity:	$v_d = 28\ \mu m/ns$ at $E = 1000$ V/cm
Lorentz angle:	$a_L = 40°$ at $E = 1000$ V/cm
gas amplification:	about $5\ 10^4$

number of wire planes:	8
number sectors / wire plane:	8
number of wires / sector:	32
total number of wires:	2048

Read out:

number of digital channels:	2048
number of analog channels:	256

8 wires (same layer, same r)	—>	1 FADC channel (8 bit, non linear)
1 wire	—>	1 digital channel


BDC reconstruction
raw data
HDBD
Qt analysis
HRDE
HRDE
single track code
showering particle code
resolve sector ambiguities
expand sector ambiguities
create hit geometry
drift time to distance relation
linearize pulses
resolve sector ambiguities
expand sector ambiguities
solve left right ambiguities
create pulses in space
create cluster
pattern recognition
Kalman filter
track fit
HDTF
HETF

Status of HDREC

Only minor changes to the BDC reconstruction software

- write raw data banks instead of track banks to DST

- consider only tracks with $N_{hit} > 5$

- adapt to changes in the BDC readout software

  readout writes 1 raw data bank HDBD per VME crate
  => merge both banks into one HDBD on L4

- bug fix in HDRAWCK

  check and cut on the bank size via NBOSIW
  => events with a raw data size > 4 kb were not rec.
  fix on L4 since run 183697
  tiny effect on F_2 measurement

- cosmetics to make non SGI compilers happy

BDC reconstruction in the analysis step

Since end of 96 the track banks of the BDC reconstruction were replaced by the raw data banks on the DST

- reduction of the DST size by 1-1.5 kb
- raw data access for improvement of the BDC reconstruction
- BDC track banks are still on POT level

Recreate BDC track banks for the analysis process

- process BDC reconstruction module before your analysis module
  - analysis module has access to the banks in the output stream
- process BDC reconstruction within H1PHAN or within any other analysis module
  - subroutine without module steering
  - access to all information produced during the reconstruction

H1PHAN:

- reconstruction is switched on by overwriting the HRON card in the text bank QHDR

other:

- link h1phan and h1rec8 library
- add CALL QHDREC
- reconstruction is switched on by overwriting the HRON card in the text bank QHDR

Tasks related to the improvement of the BDC reconstruction

- Improvement of HDREC with respect to the θ_e measurement

  -alignment studies of the BDC with CT , BDC with SPACAL and BDC with BST using π 's

  -dead material distribution in front of the chamber

    "25 cm problem" (discussed within ELAN)

    improve reconstruction in case of large Q density, e.g. use shower code or combine with other subsystems

    improve dead material description in MC

  -usage as preshower detector for SPACAL energy measurements

- Improvement of HDREC with respect to the measurement of charged hadrons

- Efficiency studies for various gas conditions during 96/97 data taking using π 's

- Long term stability studies for 96/97 data taking using selected data

- Release software tools concerning BDC analysis

  - selection of the BDC track corresponding to the e or π by combining with information from other subsystems
  - provide correction routines for the chamber position and alignment