Status of the drift chambers of the BGO-OD experiment

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Overview

The BGO-OD experiment at ELSA

The drift chambers
  construction
  status
  test measurements
  efficiency measurement
  high voltage control

Conclusion
The BGO-OD experiment at ELSA

- Univ. of Bonn, Phys. Inst. & HISKP
- INFN-LNF Frascati, Inst. Sup. di Sanità & INFN Roma1, Italy
- Univ. of Pavia, INFN Pavia, Univ. of Torino & INFN Torino, Italy
- Univ. of Roma „Tor Vergata“ and INFN Roma2, Italy
- Univ. of Messina, Italy
- Univ. of Edinburgh, UK
- Nat. Sc. Center Kharkov Inst. of Phys. & Techn., Ukraine
- Univ. of Moscow, Russia
- Petersburg Nucl. Phys. Inst. (PNPI), Gatchina,
- Univ. of Basel, Switzerland
The BGO-OD experiment at ELSA
see also HK 20.1 Der BGO-OD-Aufbau an ELSA — Oliver Jahn
The drift chambers

- 4 pairs of double layers → 8 chambers
  \( x \) (vertical wires, 0°), \( y \) (90°), \( u(\pm 9°) \), \( v(-9°) \)
- hexagonal drift cells with 8.5 mm radius
- sensitive area 1.2 × 2.4 m²
- insensitive spot 5 × 5 cm²
- chamber gas is 70% Ar, 30% CO₂
The drift chambers

- 144 sense wires/chamber for $x$
- 160 sense wires/chamber for $u, v$
- 80 sense wires/chamber for $y$
- readout via CROS3 system from PNPI Gatchina
All 8 chambers are in Bonn and tested

5 chambers (one $x$, all $u$ and $v$) installed
test measurements: drift time
correlation between chambers

2 chambers with vertical wires
efficiency measurement

- define “Track” as hit in first chamber and TOF
- look for double hits in second chamber

- efficiency for double hit in double layer: 94%
- single hit efficiency 97%
high voltage control

- at present: 1 HV channel per chamber
- high current threshold needed
- split chambers into several hv sectors
high voltage control

1 spill ~5.1s
HV control: monitor cards

- HV fuse cards with 10 channels (1 card/chamber)
- current measurement and threshold for each channel
- switch off HV for a complete chamber
- card controlled via microcontroller with opto-insulated serial USB interface
Conclusion

▶ All 8 chambers are ready & tested
▶ 5 chambers installed in area
▶ next test beam in April
▶ segmented HV control in production
▶ waiting for data that can be taken...
See also:

- HK 20.1 Der BGO-OD-Aufbau an ELSA — Oliver Jahn
- HK 20.2 Datenerfassung für das BGO-OD Experiment an ELSA — Daniel Hammann
- HK 28.6 Das Tagging-System des BGO-OD-Experiments an ELSA — Georg Siebke
- HK 28.7 Tagger electronics for the BGO-OD experiment — Francesco Messi
- HK 39.26 Entwicklung eines Triggermoduls für das BGO-OD-Experiment an ELSA — Daniel Hahne
- HK 39.41 Slow-Control des BGO-OD-Experiments — Jürgen Hannappel
- HK 46.5 Simulation of the BGO-OD experiment at ELSA — Russell Johnstone
- HK 46.6 Produktion linear polarisierter Photonen und Bestimmung des Polarisationsgrades — Andreas Bella