

Detektory a principy detekce 02DPD

Introduction

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Version 2

Content of the course

- 1 Units of radiation measurements and radiation sources
- 2 General properties of radiation detectors
- 3 Ionization chambers, proportional detectors
- 4 Semiconductor detectors
- 5 Scintillation detectors and light collection
- 6 Photomultiplier tubes and photodiodes
- 7 Cherenkov and transition radiation detectors
- 8 Miscellaneous and historical detectors
- 9 Neutron detection

Practical informations

- References for 02DPD, ordered according importance to the course



G. F. Knoll, Radiation detection and measurement, John Willey and Sons, 2010



C. Grupen, B. Schwartz, Particle detectors, Cambridge University Press, 2011



C. Leroy, Principles Of Radiation Interaction In Matter And Detection, World Scientific Publishing Company, 2009

- Other books on particle detectors



S. N. Ahmed, Physics and Engineering of Radiation Detection, Elsevier, 2015



S. Tavernier, Experimental Techniques in Nuclear and Particle Physics, Springer-Verlag, 2010

- Examination

- ▶ Oral exam, two questions about basic principles of some detectors
- ▶ Most parts covered in book by Knoll, some topics in Grupen, Schwarz
- ▶ Only very special details in book by Leroy for those who will be interested

General principle of particle detector

- Interaction of the radiation in sensitive volume of the detector
- *Ionizing radiation* defined as a radiation of energy greater than minimum required to produce the ionization
- Some amount of electric charge generated within the sensitive volume
- Collection of the charge into electrical signal, typically movement of the charge by an external electric field
- Time in the range of ms \rightarrow ns
- We measure the electrical current induced by the charge