

PALACKÝ UNIVERSITY OLMOUC
FACULTY OF SCIENCE
JOINT LABORATORY OF OPTICS

MASTER THESIS

Development of a spectrometric chain for
the detection of low-energy gamma
radiation using semiconductors.



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DECLARATION

I hereby declare that I elaborated this bachelor thesis independently under the supervision of Mgr. Leo Schlattauer Ph.D., using only information sources referred in the Literature chapter.

In Olomouc February 23, 2023

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Daniel Staník

Bibliografická identifikace

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Introduction

Chapter 1

Mössbauer effect

1.1 Physical concept

1.2 Fe^{57} spectroscopy

Chapter 2

Gamma rays properties and matter interaction

2.1 Gamma emission

2.2 Passage of Radiation Through Matter

2.2.1 Gamma matter interaction

Chapter 3

Gamma rays detection

3.1 Properties and parameters of detectors

3.1.1 Gaseous detectors

3.1.2 Scintillation Detectors

3.1.3 Detectors based on semiconductors

Chapter 4

Semiconductor Detectors

- 4.1 Principle and parameters
- 4.2 Construction scheme of Instruments for gamma detection based on semiconductors
 - 4.2.1 XR-100CdTe X-Ray and Gamma Ray Detector
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- 4.3 Available semiconductor sensors
- 4.4 Hamamatsu detectors
- 4.5 OPF420 PIN diode

Chapter 5

Detector pulse analysis

Conclusion

The work on thesis was both very hard and experiencing, and thus it can be compared to have to chug a bottle of 50% vodka - get sick, get experienced.