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Karlsruher Institut für Technologie

Gruppe Nr. ________ Kurs: **Mo** **Mi** **SS 2016**

Versuch: ____________________

Namen: ____________________

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Assistent: ____________________

durchgeführt am: ____________________

Protokollabgabe am: ____________________

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Note gesamt + 0 -

Anerkannt: ____________________
(Datum Unterschrift)

Datum Rückgabe: ____________________

Bemerkung:

1 Preparation

1.1 Theoretical Background

1.1.1 The Mößbauer Effect

When an atom at rest emits a photon, part of the released energy is used to satisfy momentum conservation and recoil the atom. Similarly when absorbing a photon, it has to carry the energy for the excitation and the recoil. Resonance absorption, where the absorber is of the same type as the emitter, can only occur, when the linewidth of the decay is larger than the recoil energy.

For visible light resonance absorption is possible, while it is impossible for nuclear γ-transitions.

In reality at finite Temperature of the samples the doppler effect increases the widths of the lines creating an overlap in emission and absorption spectra and enabling resonance absorption.

The Mößbauer effect occurs, when certain atoms (Fe^{57})are built into a crystal structure. Atoms in the lattice can then emit photons creating or consuming phonons.

1.1.2 Hyperfine Structure

1.1.3 Quadrupole Splitting

1.1.4 Isomery Shift

1.2 Assignments

1.2.1 Mößbauer Spectra of different Iron Compounds

1.2.2 Lifetime of 14.4 keV State in Vacromium

1.2.3 Inner Magnetic Field and Magnetic Moment of the Excited State in Iron

1.2.4 Electric Field Gradient in Iron Compounds

2 Analysis

2.1 Velocity Calibration

2.2 Spectra

2.3 Iron

2.4 Vacromium

2.5 Iron Compounds