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## Landau spectra of ZnH and neutral Zn in germanium

Keiichi Ishida

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# **Landau Spectra of ZnH and Neutral Zn in Germanium**

A thesis submitted in fulfillment of the  
requirements for the award of the degree

Master of Science (Physics)

from

University of Wollongong

by

Keiichi Ishida

School of Engineering Physics

2004

## Abstract

Far-infrared absorption spectroscopy was carried out on samples of germanium cut from single-crystal ingots doped with zinc. The ingots were grown in a hydrogen atmosphere and hence also contained the axial complex ZnH. Landau studies were made in the Voigt configuration for both the acceptors neutral zinc,  $\text{Zn}^0$ , and ZnH with **B** oriented along  $\langle 100 \rangle$  crystallographic directions. Measurements were made in a super-conducting magnet with field strengths up to 6 T for both ZnH and  $\text{Zn}^0$  using a modified slow-scan Polytec FTIR spectrometer. The incident radiation was plane polarised either parallel or perpendicular to the field. It was found that the main Landau features for both acceptors are the same as for the group III single-hole acceptor boron. The difference is in the fine-structure of the Landau lines which reflects the different natures of the acceptors boron,  $\text{Zn}^0$  and ZnH.

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