University of Zurich[UZH]

PHY401
Exercise Sheet 1

HS2025
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Due on 23 Sept. 2025

Discussion on 23 Sept. 2025

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1 Hund's rules ❖ From 2024

Hidden due to University of Zurich policy.

2 Sign and magnitude of χ ★ New

The magnetic susceptibility χ is defined via $M = \chi H$.

(a) For a paramagnet, is χ positive or negative?

(b) For a diamagnet?

(c) Compare the typical magnitudes of χ for diamagnets and paramagnets.

3 Temperature dependence of χ ★ New

Consider a collection of localized magnetic moments in a crystal. The magnetization in weak fields follows Curie's law $\chi \propto 1/T$.

(a) Sketch qualitatively how $\chi(T)$ behaves for a paramagnet as T increases.

(b) Explain why χ decreases with T.

(c) What would the $\chi(T)$ curve look like for a diamagnet?

4 Reading assignment

Read Chapter 19.3 and 19.4 in Simon's Book (you can find the book on teams)