

PHTN1300 Test #3 Overview

Quantum

- As applied to a specific laser system

- Applying selection rules to transitions (both desired and forbidden)

Calculating saturation intensity/power

- Calculation of saturation intensity given cross-section and ULL lifetime

- Calculation of saturation power based on physical laser parameters

Optics calculations

- Calculating optics reflectivities from experimental data, tube lengths (*e.g. from lab #4*)

Threshold Gain

- Formulation of both the unity gain equation and threshold gain equation

- Applied to a variety of laser cavities and configurations

Induced loss via a glass slide

- Use of the Fresnel equations

- Determination of small-signal gain (*e.g. from lab #5*)

Gain saturation

- Calculation of saturated gain, inclusion of forward and reverse powers

- Simple model for predicting output power (*e.g. from lab #5*)

Thermal Energy

- Predicting ULL population required

- Calculation of re-absorption loss