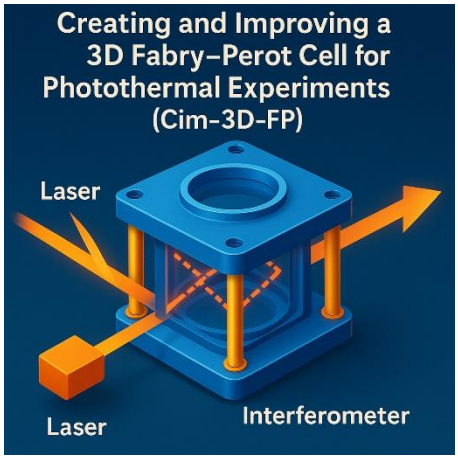
Research Field And Department	Applied Optics & Photothermal Technologies Sensors and Instrumentation Techniques Group (SITtec) - Electronic Engineering Department – Carlos III University (UC3M)
Supervisor	Oscar Bonilla Manrique
Title of the Work	Creating and improving a 3D Fabry–Perot Cell for Photothermal Experiments (Cim-3D-FP)

Abstract:



This project invites international students to take part in an exciting six-week research experience, where they will work inside the Sensors and Instrumentation Techniques Group of UC3M. The participant will design and improve a small optical device called a Fabry–Perot cell, used to detect tiny changes produced by light and heat. Students will learn how this type of optical cavity works, how light behaves when bouncing between two mirrors, and how these effects can be used to detect changes in temperature. They will have the chance to create a 3D model of the device, explore different designs, and understand how simple physical ideas turn into real scientific tools.
The entire project is carried out in a real research environment, allowing students to develop hands-on skills, creativity, teamwork, and confidence in the laboratory.

Main Tasks to Carry Out:

1. Getting to Know the Basics
   - Learning what a Fabry–Perot cell is and why it is useful in photothermal experiments.
   - Understanding simple concepts about light, heat, and optical devices.
2. Creating a 3D Design
   - Using easy-to-learn software tools to build a 3D version of the Fabry–Perot cell.
   - Exploring different shapes, sizes, and materials through guided activities.
3. Trying Out Improvements
   - Testing how small changes in the design can make the device more sensitive or stable.
   - Sharing ideas, discussing possibilities, and making creative decisions.

4. Looking at the Results
   - Observing what the model does, how light behaves inside it, and how heat affects it.
   - Learning how researchers interpret data and draw conclusions.
5. Presenting Your Work
   - Preparing a simple final presentation or report
   - Explaining what you learned and showing your improved design.
   - All these tasks are developed step by step with the help of the project supervisor, who accompanies and supports each student throughout the experience.

References/Bibliography if required

- **Development of a System Based on Photothermal Spectroscopy Using a Fabry–Perot Cell**

https://drive.google.com/file/d/1xIX-R_mafjM0a_gJEzaOlLLdDvRe2QN5/view?usp=sharing

- **Photoacoustic Spectroscopy Combined with a Multipass Circular Cell to Detect Low Concentrations of Ammonia**

https://www.mdpi.com/2076-3417/15/12/6727