

# UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

**Advanced Optics Experiments for  
the Modern Physics Laboratory  
(PHYS 311/312)**

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**Andi Petculescu**

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Name of Submitter  
*(Faculty or Staff Only)*

**UL Lafayette**

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Organization

Title:     Advanced Optics Experiments for the Modern                     Date:     01/17/2017  
          Physics Laboratory   \_\_\_\_\_

Name (Contact Person):     Andi Petculescu

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Department/College/Org:   Department of Physics

**ABSTRACT (250 words or less):**

## **PURPOSE OF GRANT**

The Department of Physics has been experiencing an influx of students, unprecedented in recent years. We correlate this renewed interest with our recent curriculum overhaul to meet the demands of the times.

In its current version, the Modern Physics Laboratory (PHYS 311/312)---also known as General Physics Laboratory III/IV---includes experiments that are generally regarded as “traditional”, in the sense of giving students a historical handle on modern (i.e. post-1930s) physics. Examples of these time-honored---albeit conventional---experiments are the photoelectric effect, Michelson interferometry, the electron charge-to-mass ratio, electron spin resonance etc. These are staples of mostly any undergraduate physics laboratory in the country.

However, as part of the ongoing drive to modernize the curriculum, we have decided it is time to include applied optics in the Modern Physics Laboratory. We are thus responding to suggestions made over the years by many of our students who wished they had the opportunity to gain hands-on experience in modern optics experiments. This is particularly significant now the prevalence of optical sensing technologies in many areas, spanning the spectrum from scientific research to industrial R&D.

The intent is to develop experimental stations that are not merely didactic, but reaching into the needs and challenges of modern applications. Thus we seek to purchase basic optical equipment for a series of laser-based experiments such as optical information processing, laser Doppler anemometry, photon correlation spectroscopy, dynamic wave scattering, Doppler emulsion characterization, as well as fundamental quantum optics.

***The funds requested will be used to purchase two single-photon counters, which form the core of all the experiments listed above. The rest of the associated equipment (e.g. lenses, mirrors, beamsplitters, mounts, posts, clamps, translation stages etc.) has already been purchased from outside funds.***

## **PROJECTED LIFETIME**

Indefinite

## **PERSON RESPONSIBLE FOR ALL ASPECTS**

-Dr. Andi Petculescu

## **BUDGET JUSTIFICATION**

Funds are requested in the amount of \$9,500 for the acquisition of 2 (two) SPCM50A single photon counters from Thorlabs. These detectors, based on sensitive avalanche photodiodes, are able to detect extremely faint optical fields such as those arising from diffusive wave spectroscopy or photon correlation spectroscopy.

## Budget Proposal

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**1. Equipment                    \$9,500**

SPCM50A Single Photon Counters (Thorlabs):  
2 x \$4,750 = \$9,500

**2. Software                    \$**

**3. Supplies                    \$**

**4. Maintenance                \$**

**5. Personnel                    \$**

**6. Other                        \$**

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**TOTAL:                            \$9,500**