

Faculty Member Contact Information

Name	Abdullatif Hamad
Contact Info	
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Department	Physics

1 Funded, one Unfunded URCA Assistant

	This position is ONLY open to students who have declared a major in this discipline.	M
	This project deals with social justice issues.	
	This project deals with sustainability (green) issues.	
	This project deals with human health and wellness issues.	
	This project deals with community outreach.	
	This mentor's project is interdisciplinary in nature.	I

Are you willing to work with students from outside of your discipline? If yes, which other disciplines?

No

How many hours per week will your student(s) be required to work in this position?
(Minimum is 6 hours per week; typical is 9)

9 hours

Will it be possible for your student(s) to earn course credit?

Yes Phys497 2-3 CH

Location of research/creative activities:

Brief description of the nature of the research/creative activity?

In this project we will study the effect of silver nanoparticles on the dynamics and strength of persistent holographic gratings in praseodymium (Pr) doped barium-tellurite glasses using the Four-wave mixing technique. Currently, we are studying the effect of Pr concentration on the holographic grating efficiency in Barium-Tellurite glasses. Previously we studied the formation of the holographic gratings in Zinc-tellurite glass doped with rare-earth ions, which showed strong persistent holographic gratings. Adding the silver nanoparticles to the Pr doped barium-tellurite glass is expected to form stronger gratings compared to those produced in Pr doped barium-tellurite glass due to the localized surface plasmon resonance as a result if the silver nanoparticles. These glasses will be made with the help of Dr. Voss in the department of Chemistry. Therefore, this project will involve the synthesis of the glasses and studying them via the four-wave mixing technique to determine the effect of the silver nanoparticles on the grating strength and growth rates. In addition, the optical absorption, index of refraction, and density of these samples will be measured.

Brief description of student responsibilities?

- 1- Student will be responsible of making the glasses with supervision.
- 2- Student will help in preparing the glasses by polishing them
- 3- Student will help in obtain optical absorption and index of refraction of the samples.
- 4- Student will help in collecting the four-wave mixing data

URCA Assistant positions are designed to provide students with *research or creative activities* experience. As such, there should be measurable, appropriate outcome goals. What exactly should your student(s) have learned by the end of this experience?

Yes

Requirements of Students

If the position(s) require students to be available at certain times each week (as opposed to them being able to set their own hours) please indicate all required days and times:

Will arrange times and days with the student

If the location of the research/creative activities involves off campus work, must students provide their own transportation?

On campus

Must students have taken any prerequisite classes? Please list classes and preferred grades:

Preference will be to students who finished Phys 201.

Other requirements or notes to applicants: