Faculty Member Contact Information

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Contact Info	
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Department	Physics

1 Funded, 1 Unfunded URCA Assistant(s)

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, in Phys497 for 203 ch credit hours.

Location of research/creative activities:

- SIUE, SE 0276

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

- In this project we will study the dynamics and strength of persistent holographic gratings in a new host glass composition containing tellurium, Zinc, and Barium using the four-wave mixing technique. Then the host glass will be doped with three different rare-earth ion, praseodymium (Pr), europium (Eu), and holmium (Ho). 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. Having the host material with both Zinc and barium is expected to form stronger gratings compared to those produced in doped barium-tellurite or zinc tellurite glass due to balancing connectivity and openness in a glass structure network. 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 new glass network 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?

- 1- The student will learn the process of making glass via the melt-quenching traditional method
- 2- The student will learn how to use polishing machine
- 3- The student will learn how to experimentally measure absorption for any material
- 4- The student will learn how to operate lasers and acquire skills of handling and building optics setups.

<u>Requirements of Students</u>

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:

- N/A