

Physics in the Phlesh

Project Ruben's Tube

Morehouse College Chapter of Society of Physics Students
Atlanta, GA

Proposers

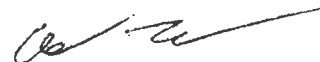
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Abstract: The purpose of the *Physics in the Phlesh* community engagement initiative will be to provide individualized mentoring and exposure to young students of Atlanta's lower-income communities who may be considering a career in science, especially those with an interest in physics or engineering.

As is true for many American neighborhoods which exist on the lower end of the socio-economic ladder, the Atlanta West End community, which surrounds Morehouse College, suffers not only from incessant poverty and resulting criminal activity but also from the absence of adequate exposure of its youth to the opportunities which await them in the world of science (in academia and industry). The hope of the Morehouse SPS Chapter is thus to heighten exposure and acquaintance with the STEM fields for youth in the West End and Greater Atlanta area as a whole by providing a number of programs which engage their particular science interests and demonstrate how scientific erudition can serve them in other aspects of life.

The Morehouse SPS Chapter currently works in conjunction with a local youth development organization, the DUKES Foundation, on a consistent basis. The DUKES Foundation is an Atlanta 501C3 mentoring program which provides local at-risk adolescent males with strong guidance and instruction on the rules of etiquette and the secrets to success within the professional world. For the past few years, the Morehouse SPS Chapter has been consistently involved with the DUKES Foundation through regular Saturday-morning math/science tutoring sessions in which students of the DUKES program receive aid on their school work and insight into completing high school and making the transition from secondary school to college. Our officers and the founder of the DUKES Foundation, Mr. Horace Dukes, have decided this year that we would like to increase the involvement of Morehouse science students in the lives of the young men of the DUKES Foundation beyond the twice-per-month tutoring sessions we already have in place.

The brainchild of our dialogue on the topic of how to further amplify interaction between the members of our two organizations was to create a group in which SPS members will lead their young mentees in a number of different fun, captivating physics demonstrations and projects. This program, Physics in the Phlesh, will include at least 2 meetings per month and more whenever the students are in

the process of completing a particular project. We have also discussed conducting a number of demonstrations at local high schools and junior high schools to draw the interests of students who are curious about ways in which physics may be "fun". Potential demonstrations which our traveling "physics circus" would display would include (but most definitely not be limited to): a hologram, a wave pendulum, a homopolar motor, the properties of non-Newtonian fluids and low Reynolds number fluids, and others. In addition to these small experiments we hope to do with the students of the DUKES program and at some local schools, we also plan, as previously mentioned, to have some long-term projects that would also be demonstrations themselves (upon completion).

Considering the strong musical interest of many youth in the African-American community, we decided that our first assignment will be the construction of a Ruben's Tube. First invented in 1905 by physicist Heinrich Rubens, the Ruben's Tube is a clever invention which manifests the relationship between sound waves and sound pressure. When one end of the tube is placed next to a speaker, the flames begin to fluctuate with the rhythm of the music, similar to the manner of the soundboard apparatus which is often found in a music studio. We have already received approval from the Morehouse fire marshal to use the tube on campus and have assessed which materials we may need.

Some of the needed materials would include:

- Steel tubing fittings, 3/8" ID, push-to-connect (PTC) , Tee connector-2.79 In stock
- Brass tubing fittings, 3/8" OD, push-to-connect (PTC) , flare 1.99 in stock
- Plastic tubing fittings, 3/8" OD , adapter to 3/8" adapters to 3/8" male NPT pipe thread(2) TBA Not instock
- Gas regulator *Higher performance ie. High output stoves* 1.99 in stock
- Brass tube Barbs 3/8 " OD For tubing and T Connector (3) 3.00
- Pipe flashing boot *optional* 1.99 in stock
- Amplifier and loudspeaker 3" *speaker and amp*
- Plastic Tubing 3/8 OD (outer diameter) for petroleum 3ft 1.99 in stock
- Steel Conduit 2" Diameter, 5' Length
- Regular steel pipe is fine
- Rubber balloons (2) , helium quality
- Rubber bands and/or strong tape
- Musical Source
- Dimensional lumber (4) , 2x4x12
- Dimensional lumber , 2x4x30 (total of 78" length)

- Deck screws , 2½" (1 box)

If our efforts are deemed worthy of the Future Faces of Physics Award, our intention would be to begin construction of the tube upon receipt of the allocated funds. As of now, the only funds we have available in our account are those collected from membership dues and recent modest fundraising efforts. We therefore hope that the national Society of Physics Students office will look on our proposed program, Physics in the Phlesh, with favor and choose the Morehouse SPS chapter as a recipient of the award. With this initial financial boost, we will be able to continue accelerating the momentum of our program until our reach is extended and our presence is known by youth across the city.

