

# STEM Society Meeting, December 11, 2012

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## **1 About the STEM Society and the STEM Society Website**

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. There are nearly 100 people on the mailing list, although a much smaller group attends any one meeting. We meet on the second Tuesday of each month at the Trailside Center at 99th and Holmes in Kansas City,

Missouri. The meetings are open to all. The start time is 6PM. We make presentations, have discussions, and sometimes have scientific demonstrations. The topics range from General Relativity to scientific experiments for kids.

The set of meeting notes may be viewed by going down the list of notes appearing on the front page of the site. These notes contains links to documents, which may be viewed or downloaded by clicking the link. Other documents can be reached by clicking the heading "Documents and Downloads" that appears on the left side of the front page. Then click on "documents." The meeting notes may also be viewed in an archive file in the list of documents. Most of the documents are PDF files. They may be viewed or downloaded to the computer by clicking, provided Adobe Reader is present, or another program capable of reading PDF files. There are usually more documents available at the site than are listed under "Documents" because they are not in the documents.htm file.

**The web site is:**

<http://www.stem2.org/>

**Direct to the documents list:**

<http://www.stem2.org/je/documents.htm>

**Direct to the archive file:**

<http://www.stem2.org/je/archive.pdf>

## **2 The December Meeting Announcement**

The December meeting of the STEM Society will take place on the second Tuesday of the month, December 11, 2012, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

A List of Possible Topics:

- (1) A Talk by David Frazee on His Projects.
- (2) Electronics: The Concept of Impedance, and A Practical Introduction to Transistors and Diodes, With Circuits.

- (3) Using Matlab and Octave for Mathematical and Scientific Computation.
- (4) Problems and Solutions.
- (5) Book Reports.
- (6) Impromptu Topics and Nonviolent Demonstrations by Attendees.
- (7) Spheres and Wine Glasses.

**The STEM Society web site:**

<http://www.stem2.org/>

### 3 Transistors and Electronics

We talked a little about the theory of semiconductors, transistors, and diodes. The paper called **Diodes and Transistors** is an unfinished document that is being written. It contains some of the discussion material. We looked at only a few things mentioned there. Specifically about a transistor test, about measuring  $\beta$  using a test circuit given in the **Diodes and Transistors** document. The document is

<http://www.stem2.org/je/diodetran.pdf>

Several multimeters were used to measure properties of the test circuit, which was mounted on a plastic breadboard. The circuit was displayed at the meeting. See the the subsections of the document under the heading **Hands on Electronics**. Also see the pictures for this meeting, which will show some of the things shown at the meeting.

<http://www.stem2.org/je/pictures121112.zip>

This includes a VRML file called **diamondlattice.wrl**, which is shows the diamond lattice crystal structure unit cell, which repeated gives the crystal structure of diamond, and also the structure of semiconductors crystals. It may be viewed, rotated, zoomed, with a VRML viewer program. If one is not available on your computer, a free download can be found. Also there will be a picture of the test setup, and a picture of the conical wineglass, and embedded balls, and elliptical section.

## 4 Matlab and Octave

I briefly showed how to use some features of MatLab and its free clone Octave.

## 5 Frazee Talk

David Frazee is interested in several topics, including new ways of generating Hydrogen, classic and historical electrical engineering, and new methods of manufacture. He presented some of this information with PowerPoint. He has investigated for example making objects using crystallization. I will make his slides and any further written documentation available here when he makes them available to me.

## 6 Wine Glasses, Tangent Balls, and Elliptical Cross Sections

We demonstrated the wine glass, illustrating the elliptical conic section proof, which is known as the *Icecream Cone Proof*, and some other ideas included in the documents, called **Pulley Belt Length, Circle Tangents, and Conic Sections**

<http://www.stem2.org/je/pulley.pdf>

and **Conics**

<http://www.stem2.org/je/conics.pdf>

## 7 Problems and Solutions

We ran out of time for these things, but I did mention a problem involving a spiral, calculating its length, and speculating on its inductance. And also a mention of demonstrating the concepts of the complex phaser in electrical engineering using an oscilloscope.

## 8 Book Reports

We did not have any extended book reports, but briefly discussed the new Kurzweil book, called **How to Create a Mind**, and the classic autobiography of physicist Richard Feynman called **Surely You're Joking Mr. Feynman**. We may discuss these books in more detail next month. Some of us had attended a talk by Kurzweil the previous Thursday at Unity Temple in Kansas City, on his new book. He said that he had attended a Unitarian church as a child, in Brooklyn, where all religions were discussed, and that this church, reminded him of that. Unity actually is not really connected with Unitarianism, but is its own "thing."

## 9 Pictures

<http://www.stem2.org/je/pictures121112.zip>