SCHSM

Southern California Home Shop Machinists March 4, 2017

OFFICERS

President	Charlie Angelis
Vice President	Michael Vulpillat
Secretary	Fred Bertsche
Treasurer	Jim Endsley

COMING EVENTS

April Meeting
Saturday, April 1, 2017
2:00 p.m.
El Camino College
(No Fooling)

May Meeting
Saturday, May 6, 2017
2:00 p.m.
El Camino College

AMETLL School Maker Faire
Hawthorne High School
4859 W. El Segundo Avenue
Hawthorne, CA 90250
Saturday, May 13, 2017
10:00 a.m. - 2:00 p.m.
http://hhsmakerfaire.weebly.com/

Picnic
Saturday, June 10, 2017
Alondra Park
Manhattan Beach Blvd.

Preface

The March monthly meeting of the Southern California Home Shop Machinists convened at 2:00 p.m. on Saturday, March 4, 2017. We met in classroom AJ115 on the first floor of the Industry and Technology Building at El Camino College in Torrance, California. There were approximately 30 members in attendance, as well as two visitors, Tom Rulla and Steve Martin.

This meeting marked the annual "changing of the guard," with the newly-elected officers stepping into their positions for the 2017 term. On behalf of the entire membership, I'd like to thank the 2016 officers, President Michael Vulpillat, Vice President Frank Schettini, Secretary Ken Rector, and Treasurer Jim Endsley for their exemplary service to the club. Their efforts resulted in another very successful year for the membership. Great job, guys!

Club Business

President Charlie Angelis reminded members that the site for our annual club picnic has been reserved for Saturday, June 10, 2017. The cost to attend the picnic was discussed during the meeting and it was agreed that $12.00 per person is adequate to cover the cost of food, supplies, and the site fee.

Charlie announced that filtered drinking water is now available in the hallway, just west of the classroom where we hold our meetings.

He also mentioned the upcoming AMETLL School Maker Faire to be held at Hawthorne High School in May and encouraged everyone to attend. Refer to the sidebar for further information.

Right: Norna Robertson, LIGO - Caltech, demonstrating a small laser interferometer to Larry McDavid and Jim Endsley

Presentation

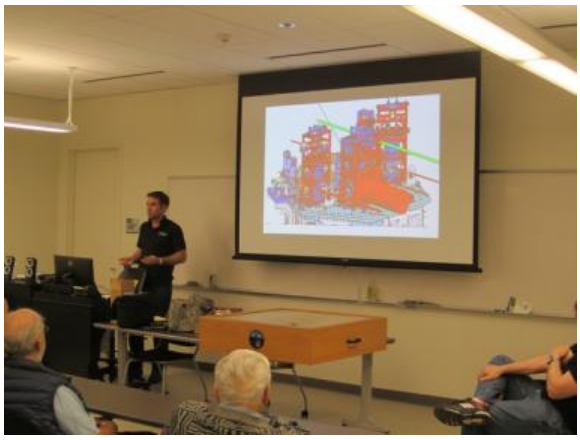
Laser Interferometer Gravitational-Wave Observatory (LIGO)

Guest Speakers:

Norna A. Robertson
Lead Scientist, LIGO - Caltech
Professor of Experimental Physics, University of Glasgow

Eric Gustavson
Head of Instrument Science Group, LIGO-Caltech

Callum Torrie
Researcher and Senior Systems Engineer, LIGO - Caltech



Callum Torrie, LIGO - Caltech

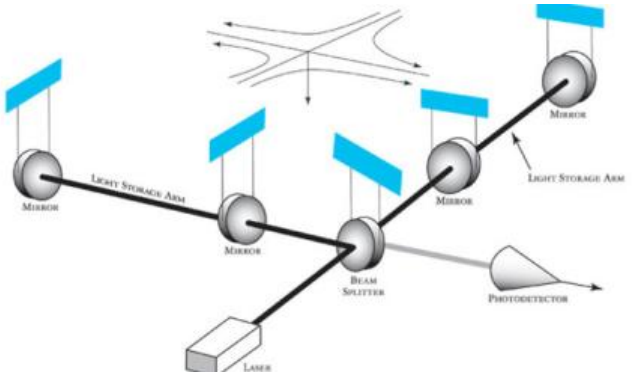
We were privileged to have three distinguished guest speakers from Caltech address our group regarding the LIGO project. Using a team approach and a detailed slide presentation, the speakers gave an informative overview of LIGO, including its mission, facilities, instruments, and the science behind it all. They brought a model of the interferometers installed in their facilities, and another model that demonstrates how gravitational waves are generated.

LIGO Facilities - L: Hanford, WA; R: Livingston, LA (Image: LIGO)

They explained that LIGO was developed to detect and measure gravitational waves – ripples in space-time, often generated by massive objects, such as black holes in deep space, moving around each other at ever increasing rates and with violent accelerations. Neutron stars and supernovae also generate gravitational waves. LIGO is not an observatory in the typical sense of the word. Unlike optical or radio telescopes, it is blind to outside light. Gravitational waves are not part of the electromagnetic spectrum and, therefore, cannot be seen. The presenters explained that LIGO is not a single observatory, but a network of facilities thousands of kilometers apart. One facility can detect gravitational waves, but additional facilities are necessary to confirm readings and act as a safeguard to rule out local influences that might generate false readings.

Each LIGO facility has at its core a highly evolved Michelson laser interferometer. The following is a grossly oversimplified version of how a ***basic*** interferometer works. Laser light is passed through a beam splitter which splits a single beam into two identical beams. One beam passes straight through and the other is reflected at 90 degrees. Each of these beams travels down a separate light storage arm, strikes a mirror at the far end, and is reflected back toward its source. Once back at the at the source end of the light storage arms, the beams again pass through a beam splitter where they are merged back into a single beam.

In 'merging', the light waves from the two beams create an interference pattern (hence the name interferometer) before traveling to a photodetector which measures the resulting beam's brightness. If the two beams travel exactly the same distance (i.e. the light storage arms were exactly the same length) before recombining, the photodetector will either see a beam as bright as the pre-split beam or nothing at all, depending on how the mirrors are set up.



Basic arrangement of a laser interferometer (Image: LIGO)

In an interferometer, any change in light intensity (higher or lower) indicates that something happened to change

the distance traveled by one or both laser beams. A gravitational wave passing through a LIGO facility causes minute changes in the distances between the mirrors and the light source, leaving a recognizable signature in the interference pattern feed. The interference pattern feed is analyzed to calculate precisely how much change in distance occurred. The resulting data is used to determine the intensity and amplitude of the wave. LIGO's interferometers are designed to measure a distance 1/10,000th the width of a proton. Your mileage may vary.

To provide a sense of scale, each of LIGO's light storage arms is 4 kilometers (2.485 miles) in length. However, by using a series of mirrors within the arms, LIGO scientists and engineers have increased the distance travelled by the laser beams to 1120 kilometers (696 miles.)

On September 14, 2015 at 5:51 a.m. Eastern Daylight Time, LIGO scientists, for the first time, detected gravitational waves arriving at earth from a cataclysmic event in the distant universe – specifically, the collision of two black holes – that occurred 1.3 billion years ago. The waves were detected by both of the twin LIGO detectors, located in Livingston, Louisiana, and Hanford, Washington. This confirmed a major prediction of Albert Einstein's 1915 general theory of relativity.

The presentation was very well received, and member participation was high. A special thank you to our guest speakers, and to Don Huseman for making the arrangements. For a more comprehensive understanding of LIGO, go to https://www.ligo.caltech.edu/page/learn-more . Be sure to explore all of the tabs and links.

Show and Tell

In keeping with tradition, Doug Walker presented incoming president, Charlie Angelis, with an engraved gavel to use while presiding over club meetings. Doug did the engraving himself using equipment in his home shop.

Larry McDavid showed an assortment of useful specialty tools. The first was a Model SL/PZ2 x100 328 Wiha insulated driver. It combines a Posidrive bit with the tip of a flat blade screwdriver for very positive engagement with the fastener. It's used by electricians to secure the specialized screws on receptacles and light switches. Larry compared and contrasted this driver with a similar one he showed at a previous meeting. That driver had a Phillips tip incorporated into the tip of a flat blade screwdriver. He also gave a brief description of Phillips, JIS, and Posidrive drivers, as well as their pros and cons.

Wiha Driver, Model SL/PZ2 x 100 328


Cork boring set. Cutters nest for compact storage. Inset: Vintage sharpening tool for sharpening cutters.

Larry also showed a cork boring set and a vintage tool designed to sharpen the business ends of the cutters. He uses the cork boring set to make gaskets from sheets of rubber and fiber gasket material, and also to core holes through the centers of rubber bottle stoppers.

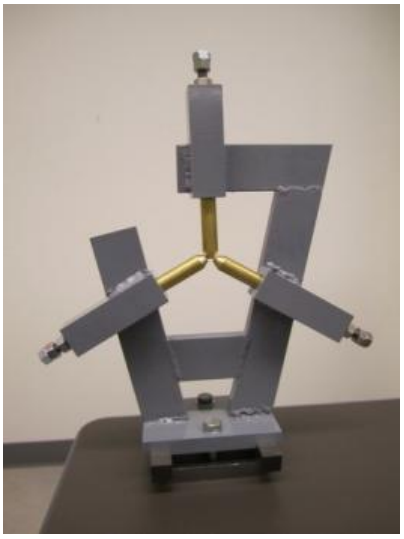
Lewis Sullivan showed a Whitney No. 12 Hand Punch that he acquired for a song at the Old Tool Swap Meet last month. He said he replaced the internal bearings, repaired a damaged lock ring, and gave it a coat of paint. His No. 12 punch came with a punch insert, but the matching die was missing. Although new dies are readily available, Lewis chose to make his own. He searched his shop, found a suitable piece of high quality tool steel, and parted it from its parent stock - the shank of a surplus 7/8" reamer. No worries, though. Given time, the shank will grow back.

Whitney No. 12 Hand Punch

After machining the tool steel to spec, Lewis hardened and tempered it with a torch and some quenching oil. It took a little fine tuning, but he came up with a die that worked just fine. Lewis also showed a fixture he made that holds his No. 12 hand punch and allows him to position and feed thin gauge sheet metal corner moulding for the punching of small holes along its length.

L: Whitney punch; R: Lewis's home-made die

Ed Fregin showed a nice steady rest he recently completed for use on his Craftsman 12" lathe. He cut the components for the main body from mild steel and welded them together with a stick welder (SMAW.) The fingers were turned from brass stock. He machined the base to fit the ways of his lathe, and fashioned a locking clamp to secure the assembly in place. Ed finished up with a coat or two of machine gray paint.



Ed Fregin's fabricated steady rest

Whatzit? A chainbreaker

Dan Snyder presented a "Whatzit" tool he acquired in a lot purchase. The group quickly identified it as being a chainbreaker for small gauge roller chain.

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The SCHSM welcomes presentations by members or guest speakers on any subject related to metal working activities. If you have some knowledge or experience you feel may be of interest to our members, or if you know someone that may have something interesting to relate, please consider making a presentation at a meeting. Presentations may be a little longer and more detailed than a show and tell, and may be accompanied by slides, video, or physical displays. Probably every member has some experience they can share, and this is the purpose of the SCHSM. Please contact President Charlie Angelis to make arrangements to give a presentation.

The SCHSM meets in Classroom AJ115 on the first floor of the Industry and Technology building of El Camino College, 16007 Crenshaw Blvd. Torrance, California, at 2:00 p.m. on the first Saturday of every month. The building is near Parking Lot B. Enter the campus from Manhattan Beach Blvd.

If you would like to contribute an article to this newsletter, or make a comment about the newsletter, contact the editor, Fred Bertsche. He can be reached via the SCHSM Yahoo Group, or at fbschsm@yahoo.com.