Volume 11, Issue 7

July— 2011

CHAPTER "99" NEWSLETTER
ASC-CA-NORTH

Membership Meeting

When: **Wednesday, July 27, 2011**

Time: **Dinner — 6:00 PM**

Where: **Lulu's Banquet Room**
2230 Pine Street (Pine St. & Cypress Ave.)
Redding CA 96001

Program : **Land Speed Racing & Addicted to Speed**

Speaker: **Tom Bryant**

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I hope you will come see the slides and hear my story...an explanation of how the Bonneville scene works, some of the various vehicles that run there, how I started this journey and some of the cars I built and ran during 50 plus years that I competed.

SALES TAX

California Statewide Sales and Use Tax Rate to Decrease by 1% on July 1, 2011. Statewide Base Tax Decreases from 8.25% to 7.25%

Click here for more information. (http://www.boe.ca.gov/news/pdf/l277.pdf)

DUES

The invoices for 3rd quarter dues have been sent out. However, they did NOT include our chapter dues increase of $15 per quarter.

Notices will be sent out with the amended total due. If you haven't paid yet, you can wait for the new invoice. If you've already paid, please send the revised balance. We apologize for any inconvenience or confusion this has caused.

As mentioned in our last newsletter, we've never raised the Chapters dues. (since 1985!) We are anxious to keep the chapter solvent and the meetings interesting. We appreciate your help.

If there are any questions, Please call me at 365-1265

Steve

Laser Sparks Revolution in Internal Combustion Engines

New laser system may lead to reduced auto emissions, enhanced fuel efficiency

WASHINGTON, April 20—For more than 150 years, spark plugs have powered internal combustion engines. Automakers are now one step closer to being able to replace this long-standing technology with laser igniters, which will enable cleaner, more efficient, and more economical vehicles.

In the past, lasers strong enough to ignite an engine's air-fuel mixtures were too large to fit under an automobile's hood. At this year's Conference on Lasers and Electro Optics (CLEO: 2011), to be held in Baltimore May 1 - 6, researchers from Japan will describe the first multibeam laser system small enough to screw into an engine's cylinder head.

A standard spark plug (left) and the micro-laser with three-beam output for multi-point ignition (right). Photo courtesy Takunori Taira, National Institutes of Natural Sciences, Japan.

Equally significant, the new laser system is made from ceramics, and could be produced inexpensively in large volumes, according to one of the presentation's authors, Takunori Taira of Japan's National Institutes of Natural Sciences.

According to Taira, conventional spark plugs pose a barrier to improving fuel economy and reducing emissions of nitrogen oxides (NOx), a key component of smog.

Spark plugs work by sending small, high-voltage electrical sparks across a gap between two metal electrodes. The spark ignites the air-fuel mixture in the engine's cylinder—producing a controlled explosion that forces the piston down to the bottom of the cylinder, generating the horsepower needed to move the vehicle.

Engines make NOx as a byproduct of combustion. If engines ran leaner – burnt more air and less fuel – they would produce significantly smaller NOx emissions.

Spark plugs can ignite leaner fuel mixtures, but only by increasing spark energy. Unfortunately, these high voltages erode spark plug electrodes so fast, the solution is not economical. By contrast, lasers, which ignite the air-fuel mixture with concentrated optical energy, have no electrodes and are not affected.

Lasers also improve efficiency. Conventional spark plugs sit on top of the cylinder and only ignite the air-fuel mixture close to them. The relatively cold metal of nearby electrodes and cylinder walls absorbs heat from the explosion, quenching the flame front just as it starts to expand.

Lasers, Taira explains, can focus their beams directly into the center of the mixture. Without quenching, the flame front expands more symmetrically and up to three times faster than those produced by spark plugs.

Equally important, he says, lasers inject their energy within nanoseconds, compared with milliseconds for spark plugs. “Timing – quick combustion – is very important. The more precise the timing, the more efficient the combustion and the better the fuel economy,” he says.

Lasers promise less pollution and greater fuel efficiency, but making small, powerful lasers has, until now, proven hard. To ignite combustion, a laser must focus light to approximately 100 gigawatts per square centimeter with short pulses of more than 10 millijoules each.

“In the past, lasers that could meet those requirements were limited to basic research because they were big, inefficient, and unstable,” Taira says. Nor could they be located away from the engine, because their powerful beams would destroy any optical fibers that delivered light to the cylinders.

Taira’s research team overcame this problem by making composite lasers from ceramic powders. The team heats the powders to fuse them into optically transparent solids and embeds metal ions in them to tune their properties.

Ceramics are easier to tune optically than conventional crystals. They are also much stronger, more durable, and thermally conductive, so they can dissipate the heat from an engine without breaking down.

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Taira's team built its laser from two yttrium-aluminum-gallium (YAG) segments, one doped with neodymium, the other with chromium. They bonded the two sections together to form a powerful laser only 9 millimeters in diameter and 11 millimeters long (a bit less than half an inch).

The composite generates two laser beams that can ignite fuel in two separate locations at the same time. This would produce a flame wall that grows faster and more uniformly than one lit by a single laser.

The laser is not strong enough to light the leanest fuel mixtures with a single pulse. By using several 800-picosecond-long pulses, however, they can inject enough energy to ignite the mixture completely.

A commercial automotive engine will require 60 Hz (or pulse trains per second), Taira says. He has already tested the new dual-beam laser at 100 Hz. The team is also at work on a three-beam laser that will enable even faster and more uniform combustion.

The laser-ignition system, although highly promising, is not yet being installed into actual automobiles made in a factory. Taira's team is, however, working with a large spark-plug company and with DENSO Corporation, a member of the Toyota Group.

This work is supported by the Japan Science and Technical Agency (JST).

CLEO: 2011 presentation CMP1, "Composite All-Ceramics, Passively Q-switched Nd:YAG/Cr4+:YAG Monolithic Micro-Laser with Two-Beam Output for Multi-Point Ignition," by Nicolaie Pavel of Romania's National Institute for Laser, Plasma and Radiation Physics; Takunore Taira and Masaki *Tsunekane of Japan's* Institute for Molecular Science; and Kenji Kanehara of Nippon Soken, Inc., Japan, is at 1:30 p. m. Monday, May 2 in the Baltimore Convention Center.

About CLEO

With a distinguished history as the industry's leading event on laser science, the Conference on Lasers and Electro-Optics (CLEO) and the Quantum Electronics Laser Science Conference (QELS) is where laser technology was first introduced. CLEO: 2011 will unite the field of lasers and electro-optics by bringing together all aspects of laser technology, with content stemming from basic research to industry application. Sponsored by the American Physical Society's (APS) Laser Science Division, the Institute of Electronic Engineers (IEEE) Photonics Society and the Optical Society (OSA), CLEO: 2011 provides the full range of critical developments in the field, showcasing the most significant milestones from laboratory to marketplace. With an unparalleled breadth and depth of coverage, CLEO: 2011 connects all of the critical vertical markets in lasers and electro-optics. For more information, visit the conference's website at www.cleoconference.org.

NO CHAPTER MEETING IN AUGUST

Ten Commandments For The Car Collector

1) Thou shalt not read thy Hemmings on company time, lest thy employer make it impossible to continue thy car payments.

2) Thou shalt not covet thy neighbor's car nor his garage, nor his battery charger.

3) Thou shalt not store thy car out-of-doors except for the wife's Toyota.

4) Thou shalt not deceive thy wife into thinking that thee is taking her for a romantic Sunday drive when indeed thou art going out to look at another car.

5) Thou shalt not love thy cars more than thy wife and children.

6) Thou shalt not despise thy neighbor's Edsel, nor his DeSoto, nor even his '47 Plymouth.

7) Thou shalt not tell thy spouse the entire cost of thy latest restoration, at least not all at the same time.

8) Thou shalt not promise thy wife a new addition for the house and then use it to store cars.

9) Thou shalt not allow thy sons and daughters to get married during the car show season.

10) Thou shalt not buy thy wife a floor jack for Christmas.

CODE of ETHICS

1. To promote good will between the motorist and the industry.

2. To have a sense of personal obligation to each individual customer.

3. To perform high quality repair service at a fair and just price.

4. To employ the best skilled personnel obtainable.

5. To use only proven merchandise of high quality distributed by reputable firms.

6. To itemize all parts and adjustments in the price charged for service rendered.

7. To retain all parts replaced for customer inspection, if so requested.

8. To uphold the high standards of our profession and always seek to correct any and all abuses within the automotive industry.

9. To uphold the integrity of all members.

10. To refrain from advertisement which is false or misleading or likely to confuse or deceive the customer.

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(Updated 9/2010)

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