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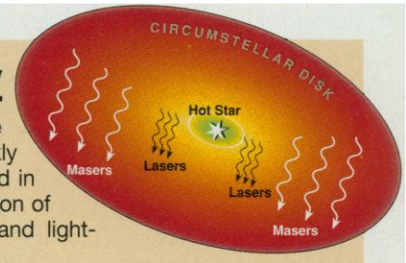

New stars, old lives, and fast delivery

How to detect and identify laser emissions in space (right), human longevity, and delivering reports quickly to the government are among the topics discussed in this weeks' letters. Other subjects include expression of major histocompatibility complex class I genes and light-emitting electrochemical cells.

Space Laser

In the News article "First light from a space laser" (8 Sept., p. 1336), James Glanz describes the discovery of possible laser emission at 169 micrometers (μm) from the disk surrounding a young star in Cygnus (MWC349). The reader might be left with the misimpression that this is the first laser discovered in space. Laser emission in the familiar 10-μm bands of CO_2 had earlier been identified in the mesospheres and thermospheres of Mars (*1*) and Venus (*2*) and are reviewed in (*3*). The same lasing bands are used in commercial CO_2 lasers for applications ranging from medicine to metallurgy.

The CO_2 nonthermal emission on Mars and Venus was first observed (*4*) by students of Charles Townes and was identified as a "natural laser" after the discovery of significant gain in the transitions (*1*, *2*). The population inversion is pumped by sunlight and thus is found only in the daylit hemisphere. The lines are about 100 million times brighter than if the state populations were in thermodynamic equilibrium, but only a small portion of the excess emission represents stimulated emission. The amplification is about 10% along the tangent path passing through altitudes of maximum gain (*1*, *2*), and this has been confirmed by several independent groups (*5*).

The amplification is comparable to single-pass gains in some CO_2 lasers on Earth, and the laser could be made to oscillate if mirrors were placed in appropriate orbits about the planet. The resulting light would be highly directional and could be detected with high bandwidth over interstellar distances with the use of currently available detection techniques (*6*). The technology of realizing planetary scale lasers is beyond our current capability, but future prospects were explored by Brent Sherwood (*7*). Meanwhile, the emission lines have proved useful for probing temperatures and winds on Mars (*3*) and Venus (*8*).

The laser detected in the star MWC349 by Vladimir Strelnitski and his team—in the H15α line at 169 μm—was preceded by the detection of maser emissions in that object in the H26α line at 850 μm and in H21α at 450 μm by ground-based observers (*9*). Distinguishing a maser in the H21α line from a laser in H15α is subject to some semantic interpretation. The latest discovery in MWC349 is interesting and suggests new directions for probing the disks around young stars. Conditions in them must be evaluated more completely before the circumstellar maser emissions, and the nebular processes revealed by them, can be regarded as completely understood.

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Reporting to the Government

The article "NRC pledges faster delivery on reports to government" by Andrew Lawler (News & Comment, 6 Oct., p. 22) states

that the National Research Council (NRC) intends to speed up the production and release of reports, in part because of the demise of the Office of Technology Assessment (OTA). This should be welcome news to policy-makers in Washington, D.C. But the NRC is not the only organization with the ability to provide reports on science and technology issues. Increasingly, scientific societies should be prepared to produce high-quality policy reports for political decision-makers.

Toward this goal, the Association for Computing Machinery (ACM) established the U.S. Public Policy Committee of the ACM (USACM). One of the USACM's first major undertakings was to commission a study of encryption policy in the United States, a matter of great concern to many members of the computing community. With support from the National Science Foundation, the study committee released the report "Codes, keys, and conflicts: Issues in U.S. crypto policy." We are now initiating a second study "Design principles to promote public access to government data."

We are also increasing our presence in the Washington, D.C., policy process. Our motivation is ACM's belief that computer professionals have an obligation to assist the public and government officials in understanding the technical issues that we now find in many areas.

The USACM has set up a Web page to make available various reports, legislative resources, and statements on emerging policy issues. Anyone who is interested in our work on issues such as universal access to the National Information Infrastructure (NII) or intellectual property aspects of the NII can find this information at **http://www.acm.org/usacm/**

We encourage other professional societies to engage in similar efforts.

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Light-Emitting Electrochemical Cells

The polymer light-emitting electrochemical cell recently reported by Qibing Pei *et al.* (Reports, 25 Aug., p. 1086) represents an interesting and potentially useful device. However, light-emitting electrochemical cells have been investigated for more than 30 years, beginning with research by E. A. Chandross at Bell Labs, D. M. Hercules at the Massachusetts Institute of Technology, and our group at the University of Texas at Austin. Although such cells are described by different terminology than that used in the report by Pei *et al.*, electrochemiluminescence (or electrogenerated chemiluminescence—ECL) basically involves the same phenomena and concepts as those in the cell described by Pei *et al.* The reduced ("*n*-doped") forms generated at the cathode react with oxidized ("*p*-doped") forms produced at the anode to form excited states that emit light. In fact, ECL in polymer-based systems was demonstrated some time ago (*1*). Indeed, in a recent paper co-authored by one of the authors of the *Science* report (*2*), ECL in a film of a polyphenylenevinylene was demonstrated.

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