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## US science falsely rejects new explanation of sonoluminescence.

For Immediate Release

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Released by: Thomas Prevenslik  
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### Summary:

New theory of sonoluminescence (SL) claiming the light is produced at ambient temperature by the mechanism of cavity quantum electrodynamics (QED) is falsely rejected for publication.

### For Immediate Release:

SL is known to produce light from bubble in water under ultrasound, the mechanism thought to be the adiabatic compression heating of air during bubble collapse. However, the bubbles are not filled with air, as there is no time at ultrasonic frequencies for the air dissolved in the water to diffuse into the bubble. In fact, the bubbles nucleated in water under ultrasound are only filled with condensable water vapor. By Le Chatelier's principle, water vapor in 2-phase equilibrium with the liquid bubble walls tends to maintain ambient temperature during collapse. Thus, SL light is produced by some mechanism at ambient temperature – not at high temperature.

SL light at ambient temperature is explained by treating the collapsing bubble

at the nanoscale as a QED cavity having an EM resonance at vacuum ultraviolet (VUV) frequencies. At ambient temperature, the thermal  $kT$  energy of atoms in the bubble wall is emitted as infrared (IR) radiation. But the IR radiation is suppressed from the atoms on the bubble surface by the VUV radiation standing in resonance across the QED cavity. This is consistent with the experimental fact that low frequency radiation is forbidden to exist in a high frequency cavity. Since the loss of IR energy can only be conserved by an equivalent gain at the resonant frequency of the QED cavity, and since the QED cavity is resonant in the VUV, the IR radiation undergoes spontaneous frequency up-conversion to VUV radiation. The VUV excites the water molecules adjacent argon atoms in the water to produce excited hydroxyl OH radicals that produce the SL light as they return to the ground state.

Frequency up-conversion of IR to the VUV is usually considered forbidden, but in a QED cavity frequency up-conversion is spontaneous because EM energy must be conserved.

But in a recent review by a reputable scientific journal, the reviewer stated:

“It would make sense to discuss the paper in detail if the general idea (Cavity QED induced EM radiation) were true and it was not in conflict with basic theoretical principles and numerous experimental data. This idea does not follow from the law of energy conservation (though the author for some reason refers to it permanently) and disagrees with the second law of thermodynamics.”

The reviewer can only be prejudiced as he surely knows EM energy must be conserved in a QED cavity.

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**For more details:** PO Box 515, Youngwood, PA, 15697 USA; Email: [thomas\\_prevenslik@yahoo.com](mailto:thomas_prevenslik@yahoo.com); [http://www.geocities.com/thomas\\_prevenslik](http://www.geocities.com/thomas_prevenslik)

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