

[Published Sept. 10, 2007, New Energy Times]

To the editor:

Regarding your article "The New Energy Times Special Report on Bubble Fusion / Sonofusion:

On behalf of me and my co-author colleagues engaged in bubble fusion research, I offer my appreciation for all the effort you and your staff at New Energy Times have put in to arrive at such a comprehensive and detailed account of a complex stream of events related to acoustic inertial confinement (bubble) fusion.

The work speaks for itself and promises to be a reference source - perhaps of historical significance.

I would like to offer a few comments and corrections on two chapters of your Special Report in the interest of factual accuracy, so that your readers can judge for themselves:

1) Chapter 1 - Pages 15 and 16

You correctly cite the need for nuclear "ash" from conventional fusion (being neutrons and comparable amount of tritium), then suggest calling bubble fusion anomalous reactions, based on the report of Dan Shapira and Michael Saltmarsh from Oak Ridge National Laboratory (ORNL).

This characterization is incorrect for the following reasons:

- Shapira and Saltmarsh did not measure for tritium for that single one-hour data acquisition with cavitation on. Per my records, on July 21, 2001, Shapira visited my laboratory at ORNL to acquire data. Saltmarsh was not present. Shapira spent one hour obtaining neutron-gamma-sonoluminescence data for an experiment involving neutron-induced cavitation with deuterated acetone.

This was followed with another hour obtaining similar data with cavitation turned off. Shapira did not obtain data related to tritium for the experiments of that day. How can one claim a neutron-tritium mismatch if Shapira and Saltmarsh measured for neutrons but not for tritium? It's like comparing apples with oranges.

- Shapira and Saltmarsh did observe (by their admission) a statistically significant quantity of neutron (nuclear) emissions from the experiment with cavitating deuterated acetone. They did not observe neutron-sonoluminescence light coincidences to within the nanosecond period.

In your Special Report (Page 38, second paragraph) you have quoted my colleague and co-author Colin West, who has given a very insightful explanation to you on the futility of searching for neutron-sonoluminescence nanosecond coincidences in a multibubble environment. The important signatures are neutrons, secondary gamma photons and tritium.

- The Shapira and Saltmarsh raw data were analyzed in depth, and a report of clarification showing successful bubble fusion attainment was deemed worthy by ORNL management of being included along with the Shapira and Saltmarsh report in the 2002 *Science* paper (Taleyarkhan et al., 2002).

This clarification report constituted Reference 32 of my 2002 *Science* paper. ORNL management consciously mandated this approach so that readers could judge the facts for themselves instead of relying on the rumor mill. The clarification Reference 32 is attached (Exhibit 1). Thereafter, a more detailed explanation was published for the lay audience in a special issue of *Journal of Power and Energy* (Exhibit 2).

Shapira and Saltmarsh have issued no statement refuting the conclusions of Exhibits 1 or 2. Regarding the telltale nuclear "ash," my team has provided numerous proofs for the presence of neutrons of the right energy (2.5MeV) which are accompanied by a comparable amount of tritium. See our 2004 *Physical Review E* paper (Exhibit 3), from which I would like to summarize the following key findings:

- Figures 4a and 4b provide evidence of neutrons being emitted "visibly" - thousands of times over background.
- Figure 7 offers evidence that neutrons are emitted in a time-correlated manner with sonoluminescence light emission, indicative of the fact that neutrons are emitted when the bubbles have imploded and the contents are hot/compressed.
- Figures 8 and 9 offer evidence to demonstrate that the neutrons emitted are 2.5MeV in energy and with 35 standard deviations in statistical significance. These data also indicate that gamma photons are released in much smaller quantity (as expected because D-D fusion does not produce gammas itself; gammas are produced as a consequence of neutron absorption in hydrogen, etc.)
- Finally, Figure 11 offers evidence for tritium data, and right above that plot is the explanation that the neutron output is comparable to the tritium output. This is as expected of conventional thermonuclear fusion "ash." Similar evidence also was provided earlier in our 2002 *Science* paper.

Our group's 2006 paper published in *Physical Review Letters* (1/2006) clarified once and for all (on which you have written so eloquently) that the self-nucleated experiments produce neutrons of 2.5 MeV energy. This took care of the last remaining criticism of skeptics.

2) Chapter 10 - Page 80

It is incorrectly cited that Purdue retracted the claim to independence. It is true that the December 2006 report from the C-22 Inquiry Committee included a few thoughts and doubts related to independence of the Xu/Butt and Forringer et al. publications. However, that position was based on incorrect and insufficient information available to the committee members at the time.

Within a few days of the review committee report, in December 2006, an explanation with evidence for correction of facts (Exhibit 4) was related to Peter Dunn, Purdue's research integrity officer, from Larry Selander of Duane Morris, LLP, and has been formally included in the university's archives.

I am aware of no retraction by Purdue as related to independence of the confirmation studies on bubble fusion, as stated in your article. To the contrary, the Jan. 7, 2007, press release (Exhibit 5) from Purdue University concluded with positive statements supporting the science and efforts related to bubble fusion "Professor Taleyarkhan is engaged in very promising, significant research."

Once again, on behalf of my co-authors, I would like to thank you and your staff of *New Energy Times* for the professionalism, insight and courage you have shown and continue to display to the world. The scientific community owes a debt of gratitude to you and to your sponsors.

Sincerely,
Rusi Taleyarkhan, Ph.D.
Arden L. Bement Jr. Professor of Nuclear Engineering
College of Engineering, Purdue University

References Cited:

Forringer, E. R., D. Robbins, and J. Martin, "Confirmation of Neutron Production During Self-Nucleated Acoustic Cavitation of Deuterated Benzene and Acetone Mixture," Proc. Intl. Conf. Fusion Energy, Albuquerque, NM, USA, November 2006.

Nigmatulin, R. I., R. P. Taleyarkhan and R. T. Lahey, Jr., "Evidence for Nuclear Emissions During Acoustic Cavitation Revisited," J. Power and Energy, Vol. 218, Part A, 2004.

Taleyarkhan, R. P., C. D. West, J. S. Cho, R. T. Lahey, Jr., R. I. Nigmatulin, and R. C. Block, "Evidence of Nuclear Emissions During Acoustic Cavitation," Science, 295, 1868, March, 2002.

Taleyarkhan, R. P., R. C. Block, C. D. West and R. T. Lahey, Jr., "Comments on Shapira/Saltmarsh paper," (<http://www.rpi.edu/~laheyr/SciencePaper.pdf/>).

Taleyarkhan, R. P., J. S. Cho, C. D. West, R. T. Lahey, Jr., R. I. Nigmatulin and R. C. Block, "Additional Evidence of Nuclear Emissions During Acoustic Cavitation," Phys. Rev. E., 69, March, 2004.

Xu, Y., and A. Butt, "Confirmatory Experiments for Nuclear Emissions During Acoustic Cavitation," Nuclear Engineering and Design, 235, 1317, 2005.

Attachments:

Exhibit 1: Ref. 32 of Taleyarkhan et al. (Science, Vol. 295, March, 2002)

Exhibit 2: Article by Nigmatulin et al. (J. Power and Energy, Vol. 218, 2004)

Exhibit 3: Article by Taleyarkhan et al. (Phys. Rev. E, Vol. 69, March 2004)

Exhibit 4: December, 2006 letter of clarification from L. Selander to P. E. Dunn.

Exhibit 5: January 7, 2007 Press Release from Purdue University.

[Ed: New Energy Times thanks Professor Taleyarkhan and colleagues for the corrections.]