

LETTERS

Observations

NELSON/JASPER RIDGE BIOLOGICAL PI

A reader asks why studying "the demise" of a butterfly population was more important than intervening to "try to save" it (right, *Euphydryas editha bayensis*). Physicists present their case that a collision event warrants "further investigation." "Fairer evaluations for young scientists" might result, it is said, if scientific papers described "who was responsible for what." And asbestos removal is advocated for the Jussieu campus of the Université de Paris.



Butterfly Watching

With respect to the Research News article "Much-studied butterfly winks out on Stanford preserve" by Ellen McGarahan (24 Jan., p. 479) about the loss of the Jasper Ridge checkerspot butterfly, it is not clear why watching the demise of this population (about a dozen individuals in a preserve in California) was an important research opportunity that precluded intervening to try to save the butterflies. Nor is it clear what data were garnered, what specific hypotheses were under examination, and what possibilities were ruled out by this "enlightening" study of extinction.

Steven B. Sands
1298 Pequot Trail,
Stonington, CT 06378, USA
Email: sandssb@pfizer.com

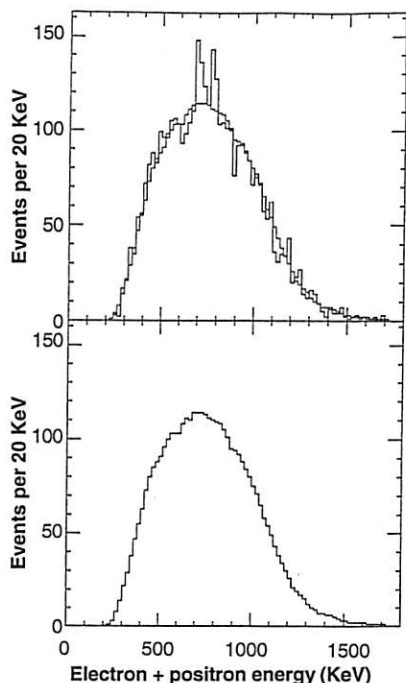
APEX: An Unexplained Event

In Gary Taubes' article "The one that got away?" (News & Comment, 10 Jan., p. 148), we are portrayed as being at odds with "virtually every nuclear physicist who has worked on the [APEX] experiments." While that may be true, the article could be interpreted as casting doubt on our scientific judgment and implying that somehow our support was "enlisted" by Jack Greenberg for other-than-scientific reasons. Thus, we outline here the evidence for structure in the electron positron sum-energy spectrum from the APEX experiment that Greenberg has shown us which makes us believe further investigation is warranted.

The top drawing in the accompanying figure shows the sum-energy spectrum as analyzed by Greenberg and his colleague Guangsheng Xu, overlaid on a background

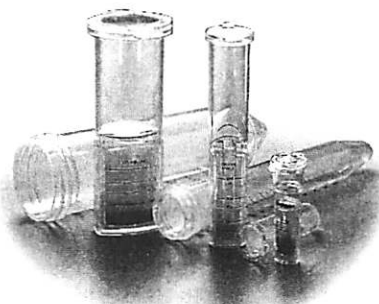
spectrum. The bottom spectrum is the background alone. The peaks between 680 and 800 thousand electron volts (keV) are in the same sum-energy region as seen in the EPOS I experiment (see the EPOS, 1990 spectrum from Taubes' article, p. 149).

We ask three questions about this structure and these peaks. First, is the deviation from the background statistically significant? By standard statistical analysis, the probability that a statistical fluctuation from the background of this magnitude would occur in the sum-energy region previously seen in the EPOS I experiment is 3.5×10^{-5} . The probability that such a deviation would occur by chance at any value of sum-energy in the spectrum is 3×10^{-3} . Thus, we consider



PROTEIN
CONCENTRATION

Maximum Throughput Minimum Time



Ultrafree-®

Centrifugal Filter Devices let you concentrate or purify protein solutions in one quick and easy step. Even microliter amounts of material can be processed with minimal sample loss.

Choose from three devices:

Ultrafree-0.5 for concentrating up to 0.5 mL down to 20 μ L in 10 min.*

Ultrafree-4 for concentrating up to 4 mL down to 50 μ L in 15 min.*

Ultrafree-15 for concentrating up to 1.5 mL down to 300 μ L in 30 min.*

Each device incorporates the Biomax™ (PES) membrane and a novel vertical design for fast concentration – without spinning to dryness. Sample recovery from the concentrate pocket or filtrate tube is convenient after a single spin.

Call or fax for more information.

U.S. and Canada,

call Technical Services:

1-800-MILLIPORE (645-5476).

To place an order, call Fisher

Scientific: 1-800-766-7000

(in Canada, call 1-800-234-7437).

In Japan, call: (03) 5442-9716;

in Asia, call: (852) 2803-9111;

in Europe, fax: +33-3.88.38.91.95

*1 mg/mL Bovine Serum Albumin, Biomax-10

MILLIPORE

www.millipore.com/ultrafree

e-mail: tech_service@millipore.com

Circle No. 4 on Readers' Service Card

the structure to be statistically significant.

Second, is the structure somehow manufactured by the cuts? The background spectrum shown is made with the use of the same analysis, but electrons and positrons from different events are chosen; that is, they are randomly associated. Such a background can also be generated by electrons and positrons in the same event, but out of time coincidence, and no structure is seen. We conclude from this that whatever the cause, the structure only occurs with correlated electrons and positrons in the same event and in time.

Third, is there adequate motivation for the cuts? Greenberg's analysis imposed only two additional cuts on the data in the spectrum shown in the article from APEX, 1995: (i) the opening angle between the electron and positron was to be greater than 135° , and (ii) there were to be only one electron and one positron in the event. The primary reason for the first cut was that the EPOS I data suggested that the electrons and positrons observed in the peaks were emitted back to back. Thus, a cut was made that would have high acceptance for such events. The second cut was intended to yield a cleaner sample. Both these cuts appear to have been well motivated.

The spectrum shown can be divided into three statistically independent samples: (i) events where both heavy ions were observed and electrons went to the right and positrons to the left of the apparatus, (ii) events where both ions were observed and the electrons went to the left and positrons to the right, and (iii) events where only one ion was observed. All three spectra show the same structure, albeit with the expected reduction in statistical significance.

With regard to Taubes' description of the generation of such structure by randomly generating events, the data shown are the total sample and have not been selected beyond the cuts shown. Thus if the peaks were a statistical fluctuation such as was generated randomly in a computer, they would have occurred with at most a 3 in 1000 probability.

The structures have been reproduced by a member of the APEX collaboration and have been seen by many in the collaboration. To our knowledge, they have not been explained in a scientifically consistent way. Nothing in Taubes' article refutes this result.

*Michael E. Zeller
Jack Sandweiss*

*Department of Physics,
Yale University,
New Haven, CT 06520-8121, USA*

Because of my involvement in the development of the theory of strong fields referred to in Taubes' article, I followed the details of the electron + positron (e^+e^-) experiments closely from their inception. There are clearly anomalous aspects of the observation of so-called e^+e^- -resonances that puzzled me right after the apparent observation of correlated e^+e^- emission. In particular, a particle interpretation seemed unlikely because it was in sharp contradiction with well-established physics (for example, the Lamb shift, $g-2$, Delbrück scattering). However, this does not detract from the possibility that positron lines and later the e^+e^- sharp sum-energy lines have been observed in the context of known physics, such as quasi-atomic phenomena correlated with nuclear effects. This is a separate consideration.

Greenberg was extremely cautious when making public statements and consistently insisted on further clarification of the positive findings in detail, as he now does for the negative results from APEX that are based on incomplete measurements and analysis.

When I doubted the existence of a new particle in an opening address at the German Physical Society meeting in Berlin in 1988, I was assailed by many experimentalists because of "my discouragement of their



So far, systems in the ÄKTA design family include:

- ÄKTAexplorer, for method development and scale up of every biomolecule
- the new ÄKTApurifier, for purification of peptides, oligonucleotides and other biomolecules

work," which they obviously believed in at that time, just as strongly as they now propose that all the narrow structures previously observed were statistical fluctuations. The retreat to this explanation appears to me (I have seen the EPOS II data discussed in seminars but not in publication), to have been influenced by premature publication of the APEX results. I have difficulties with this attitude because there exist identical observations in the literature for which the data were taken months apart and for which the analysis was carried out by physicists other than Tom Cowan and Greenberg. These data appear to represent a reproducible result in detail and not a statistical fluctuation. The measurements that are required now seem to be resisted, even though they are of paramount importance. Although I am a theorist, it seems clear to me that the experiments are still incomplete on both sides of the Atlantic, not having really addressed (contrary to some statements) the important thin-target excitation-function studies that may be the key to demonstrating reproducibility. Until these are done, I do not see how the issue of e^+e^- peaks can be resolved.

Walter Greiner
Institut für Theoretische Physik,
Universität Frankfurt am Main,

D-60054 Frankfurt am Main, Germany
E-mail: greiner@th.physik.uni-frankfurt.de

■

Authorship: Truth in Labeling

Research in many fields has become immensely complex. It often requires a combination of knowledge, technique, skills, and inventions sufficiently diverse that only the cooperation of many scientists can result in an important new result and its publication. How then should the authorship of such a paper be described? Does it even matter how the authorship is described?

Reputation is essential to obtaining research support, employment, and promotions, and it determines career trajectories in science. There is an operational importance to authorship, for the largest single determinant of scientific reputation is the papers that bear one's name. The ability to present insightful seminars, nurture young researchers, and informally exchange useful information also affect reputation; but for most researchers, these are distant secondary contributors.

As a faculty member, I often vote for the appointment of new faculty members who have only published multi-author papers.

This is perhaps becoming unavoidable in many fields, but leaves me with many questions. Can the candidate conceive a new research project, or generate an insightful idea, or solve unforeseen problems that arise during the course of research? Can the candidate write a well-structured paper? Why should the scientific literature not show the answers?

It might be argued that letters of recommendation fill the void. They do so by default, but badly. When I am reading the literature and thinking about faculty development, I would like to be able to note the originators of particularly important contributions without recourse to a letter to the head of a laboratory. And in my experience, senior scientists, aided by the privacy of a letter of recommendation or a telephone call, are not without duplicity and self-serving descriptions.

Truth in labeling of food, clothing, and drugs is effective and has resulted in better products for the consumer. The equivalent in science publication would result in fairer evaluations for young scientists, would improve their motivation, would result in a fairer funding marketplace, and thus would enhance the attractiveness of science as a career. The AAAS, in promoting science, should above all be concerned

ÄKTAdesign: an open purification platform for all of your biomolecules

What type of purification is going on in your lab? Do some of your colleagues develop methods and optimize schemes to purify peptides, proteins, or oligonucleotides at every purification scale? Are others purifying natural, synthetic and recombinant peptides? Are yet others purifying native or recombinant proteins? Or perhaps you do all of this yourself.

Doing individual types of purification has meant following individual working procedures—until now, that is. Until ÄKTAdesign (ÄKTA is the Swedish word for real; it's pronounced eckta).

**With ÄKTAdesign, your purification systems
won't act like strangers to one another**

ÄKTAdesign is the name of a new platform for a family of purification systems and pre-packed columns exclusively from us, Pharmacia Biotech. The platform integrates fully-biocompatible hardware solutions with a control system that gives you control over purification systems from lab to production scales. It lets everyone use the same better, smarter way of doing purification. All of which means you can operate every ÄKTAdesign system once you've used any one of them.

Each ÄKTAdesign system lets you use pre-set protocols that automatically resolve all major purification tasks—including automatic method scouting. Each system gives you pre-set running parameters for most purification techniques. Each system is supported with an extensive range of technique-specific, pre-packed columns. Each system automatically prepares buffers from stock solutions—without manual titration. And each system operates via UNICORN®—with this single control system, you can instantly transfer your methods to purification systems at all scales.

What does your lab want to purify today? A version of ÄKTAdesign will suit all your needs. Call us: 1 (800) 526 3593 from the USA; +81 (0)3 3492 6949 from Japan; or +46 (0)18 16 50 11 from Europe and the rest of the world. Ask for a free brochure. Or meet us on the Internet at <http://www.biotech.pharmacia.se>.

Circle No. 63 on Readers' Service Card



Uppsala, Sweden. (And the rest of the world)