

letters

Identifying "the first"

As a reader and editor of physics journals I have become disturbed by the growing practice of stating in papers that the calculation or experiment reported is "the first." Many papers repeat the statement several times (insecurity of the authors?). The practice is particularly widespread in the AIP journals and I am surprised that the editors, otherwise so conscious of linguistic, technical and ethical standards, do not clamp down on it.

In my opinion, a paper's originality or greatness should be apparent from its content, without the author having to "blow his horn." Moreover, when an author says, "this is the first observation . . .," the statement can never be proven right. The author does not know whether somebody has seen it before without telling him. At most he could say, "this is the first report appearing in print . . ." But even then, who would be willing to lay his hand in the fire for the veracity of such statement? (We recently proved wrong such a statement appearing in a *Physical Review* paper, much to the embarrassment of the authors.) The acme of the grotesque is found in the abstract of a recent *Journal of Applied Physics* paper: "The first direct effective mass measurements of electrons in metal organic vapor phase epitaxy Sn-doped $Ga_{1-x}Al_xAs$ ($x < 0.33$) epilayers from Shubnikov de Haas oscillations are reported." Thank goodness the authors did not specify x to three significant figures!

This is the first time that a complaint on this matter has been reported.

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Nuclear mean-field theory

I read John Negele's excellent article "Nuclear mean-field theory" (April, page 24) and wish to point out that self-consistent field methods have also been used recently¹ in studies of heavy-particle motion in chemical physics. In this context, the Hartree method is

exploited to describe collective, distinguishable, bound and unbound nuclear vibrational motion. The quantum SCF theory has been used to obtain ground- and excited-state vibrational eigenvalues and eigenstates for molecules as large as formaldehyde (with six coupled vibrational modes). A semiclassical SCF theory has also been developed and used to obtain a generalization of the RRK inversion method from which one can calculate information about the binding potentials of polyatomic molecules. Time-dependent SCF theory has also been considered (semiclassically) to describe collision processes as well as bound vibrational motion. Vibrational SCF methods have also been used to obtain resonance energies using both complex and real coordinates.

As in the applications to nuclear structure, the SCF approach in chemical physics yields results that are both quantitatively accurate and insightfully pleasing.

Reference

1. J. M. Bowman, to be published in *Accounts of Chemical Research*.

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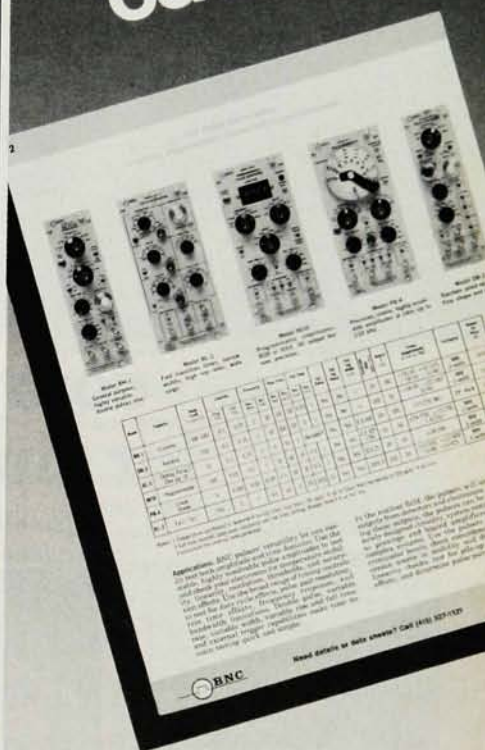
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Nonrelativistic spin

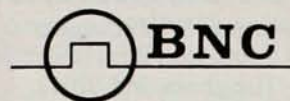
The letters of William J. Hurley (August 1984, page 80) and Paul Roman (January 1985, page 126) concerning the nonrelativistic origin of spin deserve further comment. Their ire was raised by the statement in your excellent news story "Relativistic treatment of low-energy nuclear phenomena" (March 1984, page 20) that "spin is, after all, an intrinsically relativistic phenomenon." The gist of your news item was that the intrinsically relativistic virtual-pair production terms that accompany the strong spin-orbit interaction have a profound influence upon the low-energy properties of nuclei. Whether one considers spin to be a relativistic or nonrelativistic concept is irrelevant in establishing the validity of this point.

The letters of Hurley and Roman may, unfortunately, be interpreted by

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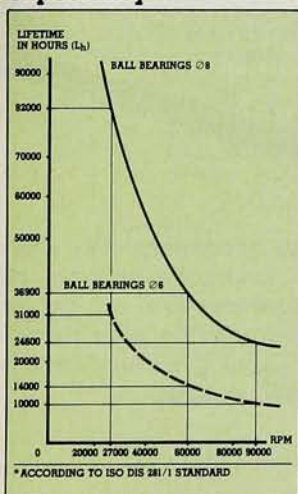
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some to support the old prejudice that the spin-orbit interaction in nuclei has nothing to do with relativity. This misconception is far more serious than the semantical error that was corrected by Hurley and Roman.

L. D. MILLER
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1/85

APS Instrument Group

A guest editorial in the March 1985 issue of *Review of Scientific Instruments* (56, 3) announced the formation of an Instrument and Measurement Science Group of The American Physical Society. I have a great interest in instrumentation, but I think it is wholly inappropriate for physicists to attempt to annex an area that has been the province of electronics engineers.

The Institute of Electrical and Electronics Engineers has long had an Instrumentation and Measurement Society. This society publishes the quarterly journal *IEEE Transactions on Instrumentation and Measurement*. I recommend that APS members who are interested in instrumentation and measurement join the IEEE. I've been a member of both APS and IEEE for many years, and I recognize their complementary roles. Preemptive maneuvers are out of order.

DEVLIN M. GUALTIERI
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4/85

W. W. HAVENS REPLIES: The APS Topical Group on Instrument and Measurement Sciences was formed because a sufficient number of APS members signed a petition to the Council to form such a group. There appear to be a large number of instrument- and measurement-science physicists who are interested in communicating with other physicists interested in the same subject, and APS is attempting to arrange for better communications in this specialty. Forming this group is not a preemptive measure by APS, but the result of a grass-roots request to fulfill a perceived need. The group appears to be very popular: 508 APS members have joined the group as of 30 June 1985.

W. W. HAVENS JR
The American Physical Society

8/85

Physics of dance

I greatly enjoyed Kenneth Laws's article, "The physics of dance" (February, page 24). I feel he articulated well

a number of points that a thoughtful dancer or dance observer may intuitively understand. As an ex-professional dancer and current teacher of classical ballet, I'd like to make a few comments:

► **Pirouettes:** Laws described how body placement and compactness are necessary "to achieve a reasonable turn rate." Such placement is also needed for proper balance, which is a prerequisite for speed in a successful pirouette.

► **Grand jeté floating illusion:** Laws analyzed a leap wherein the center of gravity shifts within the dancer's body to effect the gravity-defying illusion of "floating" briefly. An alternative method of leaping is to hold one's center of gravity as stable as possible during the leap. If the dancer attains good elevation, the result is quite dramatic, because the leap is highly arching and the pose is momentarily frozen. The figure is engraved, as it were, into the audience's psyche.

Understanding the changing-center-of-gravity phenomenon that Laws clearly explained provides greater insight into movement analysis outside of dance, too, as in sports. For example, a flexible high jumper's center of gravity can pass below the bar during a successful jump.

► **Arabesque turn:** There is a minor oversight in the text where Laws stated that it takes about two seconds to complete a single revolution of an arabesque turn. In the sidebar "Arabesque turn analysis," he used 1.25 seconds, a more practicable rate.

► **Losing and regaining balance:** Laws wrote: "Can a dancer do something to correct an unbalanced condition? One might think not, for the only source of horizontal force is at the supporting point itself." (In his analysis here, the dancer is standing on one foot and is not hopping or otherwise traveling.) His use of the term *pointe* is largely inaccurate, because standing on one foot, flat on the floor, you are on a triangular platform with the big toe, little toe and heel at the vertices. A dancer is only off balance when his center of gravity is no longer above any part of this triangle. Balance is most secure over the front of the foot, where the platform is broadest. The dancer's "squirm and wiggle" is an effort to return and maintain his balance over this area of the foot, whether he is truly off balance or not. For example, he could be standing back toward his heel and still be tenuously on balance. His effort is made to shift his weight forward to greater security.

When one is standing on *demi-pointe* (with the heel raised off the floor), the area of support is considerably reduced. Full *pointe* (on the tips of the toes with the aid of special shoes) does indeed

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