

imaginary. In a field the quantum-mechanical particle has a discrete energy spectrum. Therefore the changes of state may take place by jumping over the excluded region from m_0c^2 to $-m_0c^2$, getting from the state $E > 0$ into the state $E < 0$. This problem is known as "Klein's paradox."

We have a similar situation in the case of tachyons (see again the same figure 1). For a given energy there are also two values of P_x/m_0c . Now the particle can not exist in the region $1 > P_x/m_0c > -1$ because the energy must be imaginary. It may be possible that the tachyon leaps over the excluded region by a jump from a state P_x into a state $-P_x$. The momentum spectrum must be then discrete.

It appears to me that the roles of energy and momentum for tachyons are interchanged. In the usual quantum theory the Hamiltonian plays a predominant role. For tachyons the Hamiltonian (p, q) is a single-valued function of P . On the other hand for tachyons we have for both branches of the hyperbola two values of energy for the given momentum. It is possible that we must replace the Hamiltonian by another operator $\mathcal{P}(E, q)$. Then for the given energy we obtain two values of momentum, and the problem can be solved analogically to Dirac's or Klein-Gordon's theory.

Concerning this kind of reinterpretation, I should like to point out that in 1964 I showed that the annihilation operator in the negative energy state has the same form as the creation operator in the positive energy state.¹ This result has been obtained from the statistical mechanics of particles with negative energy.

Reference

1. V. Vysin, Phys. Letters 13, 217 (1964).
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Minority representation

While not wishing to prolong the bickering, I can not resist observing that Jay Orear's rebuttal to readers' criticism (September 1970, page 71) falls short of intellectual infallibility.

He contends that the American Physical Society does not represent the membership because it was not split in its decision concerning the Chicago meeting, while a poll of the membership indicated that almost half the membership did not agree with the Council's decision. Since the Council is elected by majority vote of the membership, one would ordinarily expect the Council to represent the viewpoint of the majority.

Certainly there is no reason to believe that all Council decisions should be divided in proportion to the various viewpoints within the membership. Orear asks how many Council members are under 40, close to students, and so forth?

The point is that the Council was duly elected by the membership. Perhaps Orear would rather have a more complicated representation in which each Council member is elected by and represents the viewpoint of a separate constituency (under 30's, military-industrial complex, New Left, and so on).

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Nuclear phase transition

In connection with your recent news report on the discovery of a phase transition in magic even-even nuclei by G. Scharff-Goldhaber and A. S. Goldhaber (November, page 17), I should like to point out that such a discovery had been previously reported by the undersigned in *Physical Review Letters* 24, 1242 (1970). In addition to reporting the existence of a remarkable discontinuity between magic and nonmagic nuclei (at $E(4)/E(2) = 1.825$), this paper also shows that magic nuclei are accurately described by the "variable moment of inertia" model (or, equivalently, the Harris model).

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Scharff-Goldhaber comments: As was mentioned in the *physics today* report, the article in *Physical Review Letters* by G. Scharff-Goldhaber and Alfred S. Goldhaber was based on the earlier work by M. A. J. Mariscotti, G. Scharff-Goldhaber, and B. Buck, *Phys. Rev.* 178, 1864 (1969). Mariscotti's letter based on the same work appeared in *Physical Review Letters* two weeks earlier. That there are many coincidences in the two letters in spite of important differences is not surprising, since both letters start from the same idea as pointed out by Mariscotti in his footnote 10: "The possibility as an extension of the VMI model was first proposed by G. Scharff-Goldhaber (unpublished)."

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The Depression and World War II

Charles Weiner ("Physics in the Great Depression," October, page 31) draws a parallel between the present and previous reduction of research funds, slackening employment opportunities, and lower public esteem for physics. His last section, titled "The problem disappears," tells us that by the spring of



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