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photon fully absorbed), speaking about the field's state or the atom's state alone is meaningless because these two systems are entangled. Any attempt to determine such a state would result in an uncontrollable perturbation spoiling our quantum nondemolition measurement.

This discussion illustrates the limits of classical language to describe quantum situations. Boucher is right to point out that the necessary short-cuts in a general-audience article might be misleading. To use only rigorous quantum concepts without the mathematical formalism that goes with them can be even more misleading. This is the difficult challenge one has to face to present such experiments to nonspecialists.

Reference

1. A. Rauschenbeutel *et al.*, Phys. Rev. Lett. **83**, 5166 (1999).

SERGE HAROCHE

(haroche@physique.ens.fr)

JEAN-MICHEL RAIMOND

(jmr@physique.ens.fr)

Ecole Normale Supérieure
Paris, France

Low Dose Rates Need Consideration in LNT?

I am not a physicist but a radiation oncologist, retired some 30 years. However, I am an honorable member of the American Association of Physicians in Medicine and an honorary fellow of the Institute of Physics and Engineering in Medicine in the UK. I have just been reading letters in PHYSICS TODAY about radiation risks (May, page 11). I personally have had more than the maximum permissible dosage of gamma radiation from radium, starting in 1930 and becoming maximal during the years 1930 to 1950, but usually at a low dose rate. The question of dose rate never seems to be considered in the letters, but when one thinks that living cells are definitely involved in time-related metabolism it seems quite likely that it is important. I am reminded of an article (published some 10 or 15 years ago) by Joel Bedford of Colorado State University, who subjected cultures of HeLa cells to radiation at dose rates of about 40 rad/h (0.4 gray/h) using time-lapse photography to record their progress. The cells died in apoptosis and not in mitosis as is the case with most cells following high doses and high dose rates.

I apologize that, as a retired clinical radiotherapist approaching the age of 95, I have neither the basic nor recent knowledge to contribute much, but I do feel that low dose rates (less than 1 gray/h) are not taken sufficiently into consideration in connection with the linear, no-threshold theory especially.

FRANK ELLIS
Oxford, England

Corrections

July, page 19—The last sentence of the middle column should refer to the tracking of atoms, not photons. Furthermore, the significance of the earlier work by the Caltech team is misstated: The Caltech researchers made the initial observations of the mechanical effects of single photons on the motion of single atoms within the setting of cavity QED,¹ as well as the first realization of trapping of individual atoms with intracavity fields at the single-photon level.² Subsequent extensive investigations led to the first real-time observations of single atoms bound in orbit with single photons, and then to the inversion algorithm described in the news story.

1. C. J. Hood, M. S. Chapman, T. W. Lynn, H. J. Kimble, Phys. Rev. Lett. **80**, 4157 (1998).
2. J. Ye *et al.*, IEEE Trans. Instrum. Meas. **48**, 608 (1999).

July, page 29—Credit for the photograph of Werner Heisenberg and Niels Bohr should read: (Photo by Paul Ehrenfest Jr, courtesy of AIP Emilio Segrè Visual Archive.)

July, pages 46, 47—The total cost for the Terrestrial Planet Finder (TPF) is estimated at \$1.7 billion. The \$200 million mentioned in the table and text is the portion of that total allocated for the current decade.

July, page 50—The Scripps Institution of Oceanography is located at the University of California, San Diego, not the Santa Barbara campus.

July, page 68—The newly elected members and foreign associates of the National Academy of Sciences were incorrectly reported as having joined the National Academy of Engineering.

May, page 48—Nikola Tesla was an ethnic Serbian, not a Croatian. (See also PHYSICS TODAY, October 1998, page 116.)

February, page 12—Reference 1 at bottom of page should read: H. Bethe, Rev. Mod. Phys. **71**, no. 2, S6 (1999). ■