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Letters

Off-the-shelf STMs

"Scanning the Surface" (SN: 4/1/89, p.200) incorrectly implies that scanning tunneling microscopy (STM) has yet to develop beyond an esoteric research topic. There are now about 400 STMs in operation worldwide, as opposed to the 100 suggested by your article, and most of these are commercial instruments. Further, about half of our customers are industrial, not academic, and most of our customers see STM as a tool, not a topic in itself.

Virgil Elings
President, Digital Instruments
Santa Barbara, Calif.

Star states

Ivars Peterson's response to Richard Dachler-Wilking (Letters, SN: 4/1/89, p.195) misses the point. The life cycle of a star ("The Hidden Lives of Massive Stars," SN: 2/11/89,

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Cover: Once researchers proved it mathematically possible to turn a sphere inside out without introducing creases, the problem became one of visualizing the process. Two recent efforts focus on using polyhedral models to show how the transformation occurs. This illustration, produced on a Stellar GS1000 graphics computer, reveals the sphere's appearance at one point in the middle of the transformation. The figure is sliced open to give a view of its interior. (Illustration: John Hughes, Jeff Vroom, David Kamins/Brown Univ.)



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p.88) is almost completely determined by its mass. Therefore, if a given star of a certain mass spends a portion of its lifetime in one state and the remainder of its lifetime not in that state, then *all* stars of that mass do likewise. Now, the sample of all stars of a given mass available for our viewing at any point in time represents a roughly homogeneous distribution of those stars across all possible ages for that type of star. Therefore we can conclude that the portion of stars of a certain type now found to be in a given state equals the portion of its lifetime that each one of those stars spends in that state.

This sort of reasoning is essential to our understanding of the life cycle of stars: They evolve so slowly by human standards that we can note their evolution only by noting the different states of large samples of stars of the same type.

Dennis Wildfogel
Los Altos, Calif.

Error or enhancement?

In the first illustration in "Scanning the Surface" (SN: 4/1/89, p.200), the caption contains the phrase "... the scanned region is 2,000 by 2,000 angstroms and the terraces are 1 atom high."

This must be an error, for the diameter of a gold atom is only a few angstroms (depending on the method of measurement), and clearly the height of the terraces is a much larger fraction of 2,000 angstroms than the above quotation would imply.

Harry H. Sisler
Distinguished Service
Professor of Chemistry
University of Florida
Gainesville, Fla.

There's no error. Just as topographic maps often exaggerate elevation, tunneling-microscope images are sometimes processed to enhance the height of surface features. — I. Peterson

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