

Sensing a Nuclear Kick on a Speck of Dust

Scientists have detected the decay of radioactive nuclei by tracking the recoil of dust-sized spheres on which the nuclei were embedded.

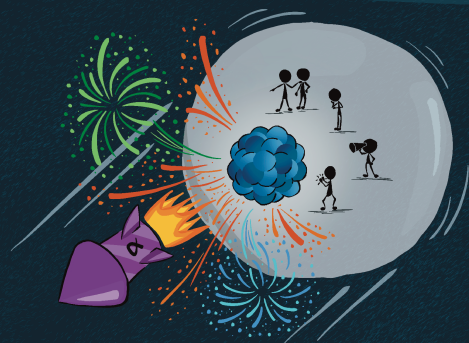
See also [Viewpoint: Nuclear Decay Detected in the Recoil of a Levitating Bead.](#)

Magazine based in Lyon, France.

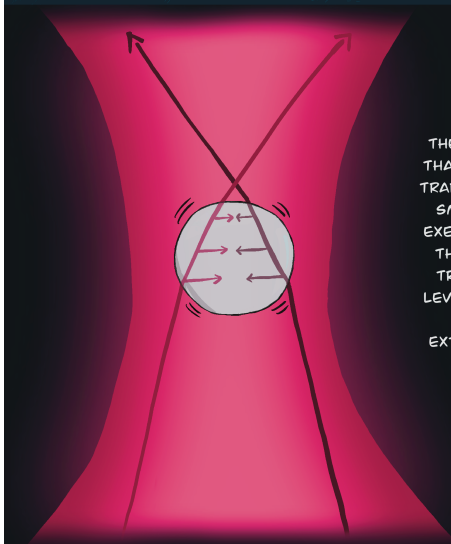
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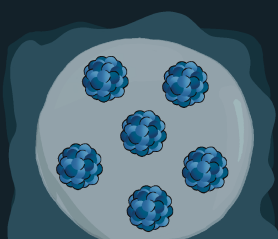


IN DR. SEUSS'S *HORTON HEARS A WHO*, AN ELEPHANT DISCOVERS THE NOISY ACTIVITY ON A SPECK OF DUST. A SIMILAR STORY HAS NOW UNFOLDED IN A LAB, WITH RESEARCHERS DETECTING THE TINY KICK FROM A NUCLEAR DECAY ON A MICRON-SIZED SPHERE. THE TECHNIQUE COULD ONE DAY BE USED TO SEARCH FOR DARK MATTER OR TO PERFORM FORENSICS ON NUCLEAR MATERIAL.

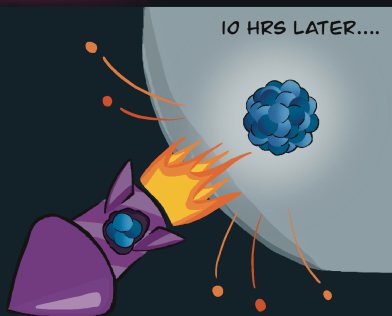


THE EXPERIMENT WAS POSSIBLE THANKS TO PROGRESS IN OPTICAL TRAPPING. LASER LIGHT HITTING A SMALL TRANSPARENT SPHERE EXERTS FORCES THAT DRAW IT TO THE CENTER OF THE BEAM. BY TRACKING THE MOTION OF THE LEVITATING PARTICLE, PHYSICISTS CAN ROUTINELY DETECT EXTREMELY SMALL FORCES AND ACCELERATIONS.

10 HRS LATER....



IN THEIR NEW EXPERIMENT, DAVID MOORE AND COLLEAGUES FROM YALE UNIVERSITY IMPLANTED RADIOACTIVE LEAD ATOMS (^{220}Pb) ON THE SURFACE OF A SILICA SPHERE HAVING A MASS OF 10 PICOGRAMS.



THE LEAD NUCLEI DECAYED OVER SEVERAL HOURS, WITH EACH DECAY EVENT PRODUCING AN ALPHA PARTICLE, COMPOSED OF 2 PROTONS AND 2 NEUTRONS. THE RESEARCHERS DETECTED OUTGOING ALPHAS THROUGH THEIR BACKWARD PUSH ON THE SPHERE, DESPITE AN ALPHA WEIGHING A TRILLION TIMES LESS THAN THE SPHERE.

