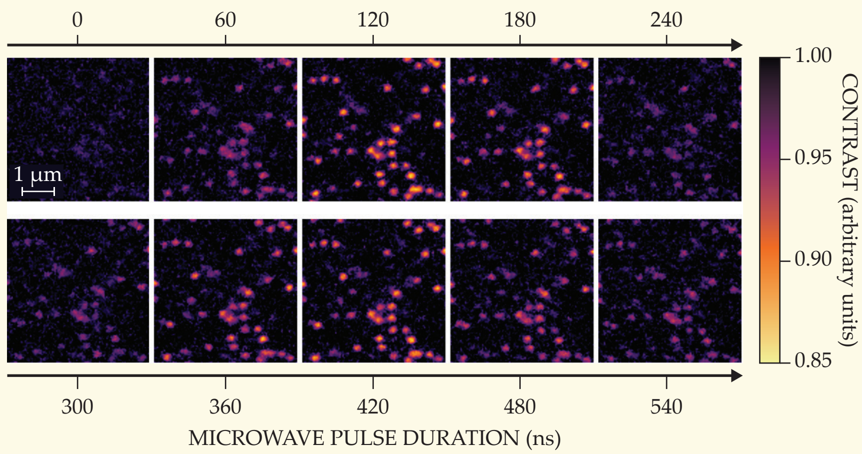
(at 7–8 TeV from 2011–12 and at 13 TeV from 2015–18), to home in on a reliable measure of *CP* violation in the baryons. Baryons and antibaryons are produced at slightly different rates, and the rate difference was corrected for in the analysis. Because the detector is made of matter, it also has a higher detection efficiency, which was accounted for as well, for matter than for antimatter. The researchers found that the beauty baryon decay rate was higher than that of its antibaryon counterpart: The relative difference of about 2.5% agrees with, and provides a more precise number than, existing theory.

Don Lincoln, a senior scientist at Fermilab and member of the Compact Muon Solenoid (CMS) collaboration, says he expects that researchers at other CERN experiments, such as CMS or ATLAS, will look to their own data to validate the result. Though the latest observation hasn't solved the mystery of matter–antimatter asymmetry, it does offer clues for where to look. Another next step will be to focus on intermediate processes in the baryon decay chain for which the observed *CP* violation is even greater, as high as 5.4%, than it is for the entire decay chain. (LHCb Collaboration, *Nature* **643**, 1223, 2025.)

Laura Fattaruso

Diamond-defect clusters are measured with speed and precision

The improvement in measuring nitrogen–vacancy quantum sensors could make them more useful for observing correlated condensed matter, biological systems, and more.



THE BRIGHT SPOTS in each panel show fluorescing nitrogen–vacancy (NV) centers over time. Two research groups each controlled dozens of NV centers in parallel and obtained spatially and temporally precise images of them with high-sensitivity cameras. (Image adapted from K.-H. Cheng et al., *Phys. Rev. X* **15**, 031014, 2025.)

In a crystal of diamond, the combination of a nitrogen atom and a nearby empty lattice site forms a nitrogen–vacancy (NV) center. NV centers are point defects that behave like tiny, atomic-scale magnetometers. Because of their sensitivity to magnetic fields, electric fields, temperature, and even strain, NV centers are useful quantum sensors for measuring surface chemistry, subcellular temperatures, and various other properties. (See the article by Lilian Childress, Ronald Walsworth, and Mikhail Lukin, Physics Today, October 2014, page 38.)

Optical measurements of an NV center's electronic and magnetic states offer nanoscale spatial resolution, but they show what's happening at only one location. Individual NV centers can be measured sequentially to cover a larger area, but that approach is slow and can't show what's happening in multiple locations at the same time. Alternatively, groups of many NV centers are measurable simultaneously, but signal averaging limits the spatial resolution.

Now researchers have combined the imaging benefits of single and multiple NV centers in one experimental platform, without each approach's limitations. Two independent groups—one led by Shimon Kolkowitz of the University of California, Berkeley, and the other by Nathalie de Leon of Princeton University—controlled and measured dozens of NV centers simultaneously. The parallel observations from multiple NV centers have the point-like precision of previous measurements of single NV centers.

In neutral-atom quantum computing, dozens or hundreds of qubits are observed simultaneously. To make the observations, researchers have recently developed arrays of optical tweezers, in which each tweezer traps a single atom or molecule. Then a high-sensitivity camera can image the atoms or molecules in parallel by precisely counting the photons generated by the molecules' or atoms' fluorescence. Both Kolkowitz and de Leon, working with their collaborators, reasoned that a similar approach could work in diamond for NV centers. The two groups used the same high-sensitivity cameras for NV center readout and then added specialized optical instrumentation that controls the NV centers and manipulates their charge and spin states.

The speedy, simultaneous, and high-resolution measurements of dozens to hundreds of NV centers allow for the study of how one NV center's state may be correlated with another's. The investigation of temporally and spatially coherent fluctuations could be useful in studying noise or other stochastic properties in superconducting materials, for example. The new capability could also be useful for observing single biological molecules *in vivo* and measuring their chemical and dynamical interactions. (M. Cambria et al., *Phys. Rev. X* **15**, 031015, 2025; K.-H. Cheng et al., *Phys. Rev. X* **15**, 031014, 2025.)

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