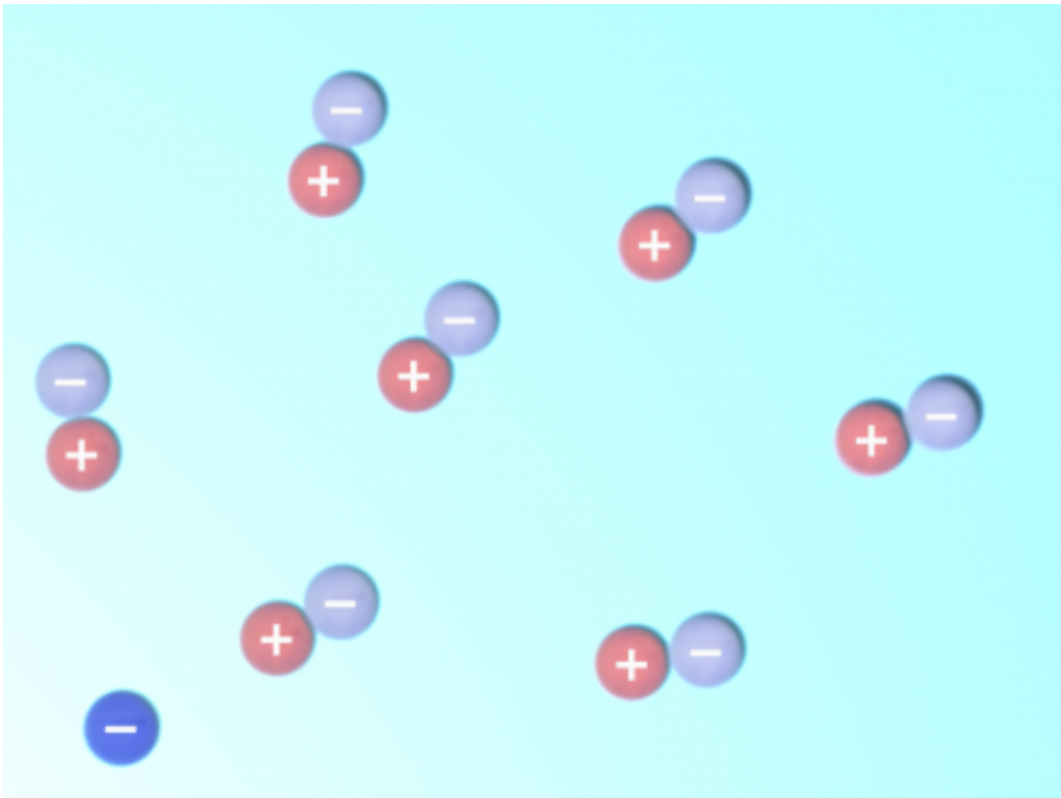


Most precise measurement of electron mass made

February 19 2014



A schematic depiction of virtual electron–positron pairs appearing at random near an electron (at lower left). Credit: RJHall/Wikipedia

Scientists in Germany said Wednesday they had made the most precise measurement yet of the mass of the electron, one of the building blocks of matter.

The feat should provide a useful tool for scientists testing the "Standard Model" of physics—the most widely-accepted theory of the particles and forces that comprise the Universe, they said.

Electrons are particles with a negative [electrical charge](#) that orbit the nucleus of an atom.

They were discovered in 1897 by Britain's Joseph John ("J.J.") Thomson, who dubbed them "corpuscles"—a name later changed to "electron" because of its connection with electrical charge.

A team led by Sven Sturm of the Max Planck Institute for Nuclear Physics in Heidelberg "weighed" electrons using a device called a Penning trap, which stores charged particles in a combination of magnetic and electrical fields.

They measured a single electron that was bound to a carbon nucleus whose mass was already known.

The electron has 0.000548579909067 of an atomic mass unit, the measurement unit for [particles](#), according to the calculation, which factors in variables for statistical and experimental uncertainties.

The estimate is a 13-fold improvement in accuracy on previous attempts at determining the electron's mass.

"This result lays the foundation for future fundamental physics experiments and precision tests of the Standard Model," according to the study published in the journal *Nature*.

More information: Study paper: [dx.doi.org/10.1038/nature13026](https://doi.org/10.1038/nature13026)

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