Possible discovery in 2015 of a new particle in physics

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The Large Hadron Collider this year will begin its second, three-year run

The world's largest atom-smasher could help physicists understand mysterious dark matter in the universe, and later this year it may offer a discovery even more fascinating than the Higgs-Boson, researchers say.

The Large Hadron Collider, built by the European Organization for Nuclear Research (CERN), has undergone major upgrades this year will

begin its second, three-year run.

CERN says that after a two-year break for upgrades, the LHC will be twice as powerful this time.

The collider is already credited with helping physicists discover the elusive Higgs boson, which helps explain how objects have mass, and which led to the award of the 2013 Nobel Prize for physics.

This year, the atom-smasher will restart at a beam energy that is substantially higher, with the goal of better understanding why nature prefers matter to antimatter.

A new discovery "could be as early as this year... if we are really lucky," said Beate Heinemann, professor of physics at the University of California, Berkeley, during a talk on Saturday at the American Association for the Advancement of Science annual meeting.

Heinemann is a member of the ATLAS research team at the LHC.

"Maybe we will find now supersymmetric matter," she added.

"For me it is more exciting than the Higgs."

Supersymmetry is an extension of the standard model of physics that aims to fill in some big gaps regarding how scientists understand matter.

According to the theory of supersymmetry, all particles have a counterpart that is heavier, and experts believe that if these partner particles are there, the LHC should be able to find them.

Since the standard model of physics cannot explain the existence of dark matter, which is thought to hold galaxies together and account for most

of the matter in the universe, supersymmetry aims to offer "a more comprehensive picture of our world," according to the CERN website.

The first of eight steps toward getting the LHC started again began on December 9, and is expected to take several months.

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