

LHC switch-on fears are completely unfounded: new research paper

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(PhysOrg.com) -- A new report published on Friday, 5 September, provides the most comprehensive evidence available to confirm that the Large Hadron Collider (LHC)'s switch-on, due on Wednesday next week, poses no threat to mankind. Nature's own cosmic rays regularly produce more powerful particle collisions than those planned within the LHC, which will enable nature's laws to be studied in controlled experiments.

The LHC Safety Assessment Group have reviewed and updated a study first completed in 2003, which dispels fears of universe-gobbling black holes and of other possibly dangerous new forms of matter, and confirms that the switch-on will be completely safe.

The report, 'Review of the Safety of LHC Collisions', published in IOP Publishing's Journal of *Physics G: Nuclear and Particle Physics*, proves that if particle collisions at the LHC had the power to destroy the Earth, we would never have been given the chance to exist, because regular interactions with more energetic cosmic rays would already have destroyed the Earth or other astronomical bodies.

The Safety Assessment Group writes, "Nature has already conducted the equivalent of about a hundred thousand LHC experimental programmes on Earth – and the planet still exists."

The Safety Assessment Group compares the rates of cosmic rays that bombard Earth, other planets in our solar system, the Sun and all the

other stars in our universe itself to show that hypothetical black holes or strangelets, that have raised fears in some, will in fact pose no threat.

The report also concludes that, since cosmic-ray collisions are more energetic than those in the LHC, but are incapable of producing vacuum bubbles or dangerous magnetic monopoles, we should not fear their creation by the LHC.

LHC collisions will differ from cosmic-ray collisions in that any exotic particles created will have lower velocities, but the Safety Assessment Group shows that even fast-moving black holes produced by cosmic rays would have stopped inside the Earth or other astronomical bodies. Their existence proves that any such black holes could not gobble matter at a risky rate.

As the Safety Assessment Group writes, "Each collision of a pair of protons in the LHC will release an amount of energy comparable to that of two colliding mosquitoes, so any black hole produced would be much smaller than those known to astrophysicists." They conclude that such microscopic black holes could not grow dangerously.

As for the equally hypothetical strangelets, the review uses recent experimental measurements at the Brookhaven National Laboratory's Relativistic Heavy-Ion Collider, New York, to prove that they will not be produced during collisions in the LHC.

Citation: The published version of the paper "Review of the Safety of LHC Collisions" (J. Ellis et al, 2008 J. Phys. G: Nucl. Part. Phys. 35 1150004) can be viewed at www.iop.org/EJ/abstract/0954-3899/35/11/115004/

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