Early results from CERN give an insight into life immediately after the Big Bang

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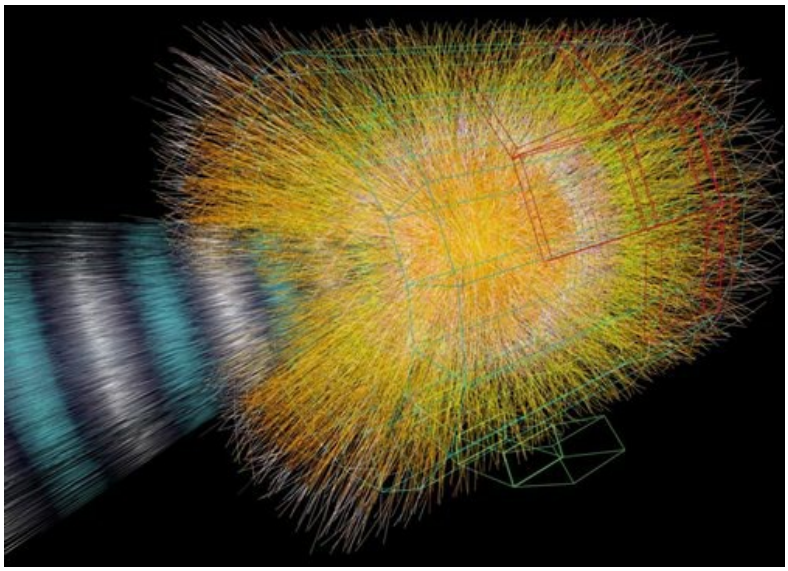
In an experiment to collide lead nuclei together at CERN's Large Hadron Collider, physicists from the ALICE detector team which includes researchers from the University of Birmingham have discovered that the very early Universe was not only very hot and dense but behaved like a hot liquid.



By accelerating and smashing together lead nuclei at the highest possible energies, the ALICE experiment has generated incredibly hot and dense sub-atomic fireballs, recreating the conditions that existed in the first few microseconds after the Big Bang. Scientists claim that these mini big bangs create temperatures of over ten trillion degrees.

At these temperatures normal matter is expected to melt into an exotic, primordial 'soup' known as quark-gluon plasma. These first results from lead collisions have already ruled out a number of theoretical physics models, including ones predicting that the quark-gluon plasma created at these energies would behave like a gas.

Scientists from the School of Physics and Astronomy are playing a key role in this new phase of the LHC's programme which comes after seven months of successfully colliding protons at high energies. Dr David Evans, from the School of Physics and Astronomy, and UK lead investigator at ALICE experiment, said: "Although it is very early days we are already learning more about the early Universe. These first results would seem to suggest that the Universe would have behaved like a super-hot liquid immediately after the Big Bang."

The team has also discovered that more sub-atomic particles are produced in these head-on collisions than some theoretical models previously suggested. The fireballs resulting from the collision only last a short time, but when the 'soup' cools down, the researchers are able to see thousands of particles radiating out from the fireball. It is in this debris that they are able to draw conclusions about the soup's behaviour.

See the **Liquid Universe press release (/news/latest/2010/11/22Nov-LHC.aspx)**