

The heat is on

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(Phys.org)—Physicists are getting warmer in the hunt for universal truths, thanks to a breakthrough by a team at the University of St Andrews.

Researchers in the School of Physics and Astronomy found that even at ultra-[high temperatures](#) of a trillion trillion degrees, the basic building blocks of life behave in the same way as they do when cold atomic [liquids](#) are chilled to a billionth of a degree.

Their results show that, no matter what the temperature or the particle, the rate at which they bounce off each other – 'scatter'– changes by the same amount as the temperature is changed.

Team leader Professor Andy Mackenzie, Professor of Physics at the University, said: "Physics is all about looking for unexpected patterns in the way things behave.

"It now seems as if matter at the extremes of conditions in the known universe behaves similarly when we had no particular reason to expect that to be the case.

"It points to the existence of universal theories that have not yet been formulated.

"These are exciting times for fundamental physics, and the work on electrons in solids also has the potential to underpin ambitious future electronics technologies."

The team examined a range of experiments which had been carried out across the whole range of temperatures known to science.

In [high energy physics](#), it is possible to create an ultra-high temperature 'soup' of [fundamental particles](#) known as the quark-gluon plasma, at temperatures of a trillion trillion degrees.

At the other end of the spectrum, cold atomic fluids can be cooled to a billionth of a degree.

The St Andrews team has worked at intermediate temperatures with entirely different particles, [electrons](#) in solids.

Provided by University of St Andrews

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