23026 Energy from Nuclear Fusion

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In December 2022, the world's most powerful laser began operating at a laboratory in California. It was an experiment that has sent shockwaves through the world of physics and beyond.

The laser targeted a fuel capsule with a diameter of 5 mm, creating temperatures and pressures which provoked a fusion reaction - the reaction which powers the sun.
The Californian facility had done such experiments before, but this time the energy that was produced from the reaction was greater than the laser power used to trigger it.

It was a crucial moment for fusion researchers as it showed that the physics works.
We have taken the first tentative steps towards a clean energy source that could revolutionise the world.

The promise of a working fusion reactor is dazzling. It would need relatively small amounts of fuel, would not produce any greenhouse gases and would leave very little of the radioactive waste that makes current nuclear reactors so unpopular.

This success in California will provide a boost for dozens of private companies which one day hope to build a commercial fusion reactor. One private project in the UK is hoping for a big year in 2023. First Light Fusion, based just outside Oxford, has a novel way of creating fusion conditions.

It fires a small aluminium disc, at speeds of up to 20km per second, at a specially designed target containing the fuel needed for fusion. On impact, that target collapses, creating huge pressure waves that can produce a fusion reaction. The company achieved success with this method earlier in 2022.

In 2023 the team will start work on a much bigger reactor, which it hopes will also, like in California, break the magic barrier in fusion - getting more energy out than was put in.

First Light Fusion is in a race with dozens of other firms trying to make fusion happen, but its founder is confident his firm is on the right track. He believes 2023 will be the year they make a significant strategic shift, from what has essentially been an important experiment, to making commercial fusion energy.

Meanwhile, back in the US, another significant announcement in the fusion world should come in 2023. The US government will announce which private company will receive $50m of funding to build a pilot fusion plant. The goal will be to have a working reactor by the early 2030s.

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