Cold fusion continues to progress stealthily into the mainstream

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Science

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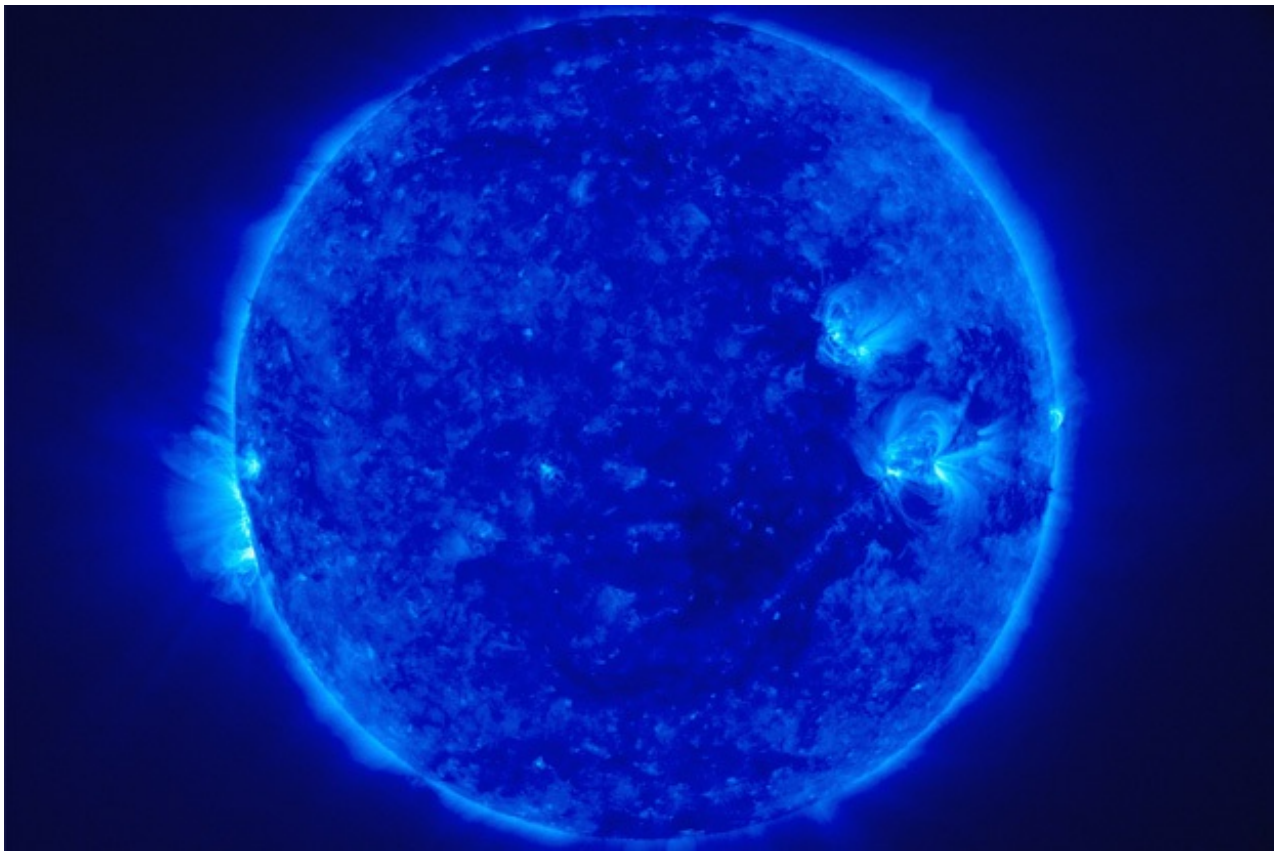

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Cold fusion, otherwise known as Low Energy Nuclear Reactions or LENR is fringe science -- but it continues to progress stealthily into the mainstream. The developments over the last few months have been in business rather than science, with focus shifting towards commercialising a technology claimed to be able to generate unlimited energy from cheap, desktop-sized reactors.

The current wave of interest was sparked by Italian inventor Andrea Rossi, who showed off his Energy Catalyser or E-Cat in 2011. Rossi claimed that his reactor produced hundreds of kilowatts, and after the demonstration, he went into partnership with an undisclosed US industrial partner. A confidentiality agreement apparently prevents him from giving any details of his work. However, while Rossi's dealings have been very much underground, others have been breaking cover.

In December, Cyclone Power Technologies, a US company known for its highly innovative Cyclone Engine, announced that Dr Yeong Kim would be joining their consulting team. Dr Kim is a professor at Purdue University and a leading researcher in LENR. In a press statement Dr Kim said that his new role with Cyclone was an opportunity for research to understand and harness cold fusion.

The Cyclone Engine is an external combustion engine -- a high-tech steam engine -- that can use virtually anything as fuel, from oil or gas to biomass or powdered coal. It can also be powered by waste heat or solar collectors, and Dr Kim suggests that a future Cyclone Engine might have cold fusion as its heat source.

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Meanwhile Brillouin, one of the lead contenders for commercialising LENR technology, announced in December that they

had signed a licence agreement with an un-named South Korean company after a year of due diligence. The deal, described as being worth 'millions of dollars' in *Pure Energy Systems News*, licenses the Koreans to manufacture cold fusion units, with production and installation in 2014.

The plan is to use reactors powered by Brillouin's cold fusion technology to replace existing boilers in a conventional power station. Bob George, CEO of Brillouin, says they should produce electricity at two cents per kilowatt-hour -- about a third of the cost of electricity from advanced gas power generation, the cheapest current option. Once the units are proven, George expects many other customers to be interested in similar retrofitting.

There has also been a small but potentially significant shift by US officialdom. Steven Krivit of *New Energy Times* noted a change in the small print of a document issued by the US Department of Energy. The DoE provides funding for innovative energy projects via their Advanced Research Projects Agency for Energy (ARPA-E). The latest funding opportunity announcement included a new addition in the list of technologies which the DoE is interested in: alongside solar, photochemical reactors and radioisotope thermoelectrics and many more, Low Energy Nuclear Reactions made the cut.

This represents the first US government recognition that the technology might be valuable. While there has been previous work on LENR as a sideline by scientists in NASA and elsewhere, there has been little sign of official funding. That may be set to change now the technology seems to have made the list of approved concepts.

The E-Cat inventor himself, Andres Rossi, has kept a comparatively low profile since teaming up with a mysterious backing company in the US. While his credibility was boosted last year by an independent report supporting his claims, some have questioned whether the US company was more than a phantom. Some sleuthing by the blog E-Cat World has provided a tentative answer, with a trail of documents leading to obscure outfit called Cherokee Investment Partnership.

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Cherokee is an investment company based in Raleigh, North Carolina; a subsidiary provides capital for solar photovoltaic projects building on brownfield sites around the world. Thomas Darden, CEO of Cherokee, is also chairman of Industrial Heat LLC. A Chinese website described a meeting between Darden and Chinese officials on the prospects for green energy, with Darden claiming positive results with the nickel-hydrogen LENR process. Some have suggested that China, where smog from multiplying coal-fired power stations causes serious health problem, may be more open to the new technology than the West. Darden will not comment on the claims.

A partnership with Cherokee would be in line with Rossi's claims about the size of his backer and the project. He says there are sixteen people working with him on R&D, consistent with a modest investment from a company like Cherokee rather than full-on involvement from the likes of General Electric (or even Google) as others have optimistically suggested. Rossi has recently said that a domestic E-Cat reactor is as far away as ever due to safety and certification issues, and his latest posts suggests that some care is needed with the industrial reactors. If the E-Cat does gain acceptance, the regulatory bodies will become more interested in the issues posed by licensing nuclear reactors based on principles which are not well understood.

And what about the Martin Fleischmann Memorial Project, the open-source consortium which set out to provide a simple, low-cost means of demonstrating that cold fusion is a real effect? While their attempts to prove excess heat production have been frustratingly slow, they had a surprising breakthrough in producing gamma radiation, an effect duplicated across two sites. This might finally be the demonstration they need, if it can be consistently replicated. But it might also throw up some problems.

The dream of cold fusion is that it brings cheap, unlimited energy from devices that can be built in a garage. But the dream has to co-exist with the messy realities of health and safety legislation, the bureaucratic niceties of testing new technology, and a public terror of anything including the word 'radiation'. It's the difference between the exhilaration of the Wright Flyer's first take-off and the thousands of pages of certification procedures to cover before new aircraft are allowed to operate.

If LENR does turn out to be a viable technology -- an uncertain proposition at best -- then the challenges involved in commercialising it are only just be beginning. The advance, if it happens, is likely to be a slow one across many fronts. Even so, 2014 is set to be a very interesting year for Low Energy Nuclear Reactions.

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