

Chinese team entangles eight photons, breaking record

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In a game of one-upmanship, a Chinese team of physicists has figured out how to entangle eight photons simultaneously and to observe them in action; the previous record was six. In a paper published in *arXiv*, the team from the University of Science and Technology of China in Hefei, describe how they were able to convert a single photon into two entangled photons, using a nonlinear crystal, and then how they repeated that process with one of the paired photons produced, while holding the other in place, producing another pair, and then did it repeatedly until they had eight photons all entangled together, all held in place and all observable for a period of time.

First predicted by Einstein, in conjunction with two other physicists, Boris Podolsky and Nathan Rosen, entanglement (from the German word *Verschränkung*) is where particles exist in a relationship so closely related, that anything that happens to one, somehow automatically happens to the other, like identical twins both feeling a pinprick on their finger tips, whether in the same room, or miles apart. In the new experiment, the researchers fired a photon from a high energy laser through a nonlinear crystal, causing it to become a pair of weaker entangled photons. They then kept one of the pair aside while the other was sent through another nonlinear crystal, producing another pair of entangled photons that were also still entangled with the original pair. They then held back one of the new pair while sending its twin through another nonlinear crystal, forming yet another pair of entangled photons that was also entangled with all the other entangled photons, and then repeated the procedure until they had a total of eight photons, all of

which were entangled together.

After several years of research, physicists have learned a lot about creating entangled particles; what they haven't been able to do is pin them down. Entangled particles, such as the photons produced in the Chinese experiment don't generally last long, which makes this experiment all the more exciting because it means the researchers were able to coax the [entangled photons](#) into hanging around long enough to be observed while the new entangled particles were coming into existence.

Many physicists have likened the whole process to the infamous thought experiment so named, Schrödinger's cat, due to the letter written by physicist Erwin Schrödinger to Einstein where he described a cat hidden in a box with a radioactive substance that may or may not have decayed to the point of discharging a poisonous substance that when released would kill the cat, which leads to the mind state of a cat existing that is simultaneously both dead and alive.

The ultimate goal in studying [entangled particles](#) is to figure out how they operate and then how to put them to use in such devices as quantum computers.

More information: arxiv.org/abs/1105.6318

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