Quantum music to my ears
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The atoms in question—Rydberg atoms—are atoms excited by lasers into a high energy state that responds in a measurable way to radio waves (an electric field). After figuring out how to measure electric field strength using the Rydberg atoms, Holloway said it was a relatively simple step to apply the same atoms to record and play back music—starting with Holloway's own guitar improvisations in A minor.

They encoded the music onto radio waves in much the same way cellphone conversations are encoded onto radio waves for transmission. The atoms respond to these radio waves, and in turn, the laser beams shined through the Rydberg atoms are affected. These changes are picked up on a photodetector, which feeds an electric signal into the speaker or computer—and voila! The atomic radio was born.

The team used their quantum system to pick up stereo—with one atomic species recording the instrumental and another the vocal at two different sets of laser frequencies. They selected a Queen track—"Under Pressure"—to test if their system could handle Freddie Mercury's extensive vocal range.

"One of the reasons for cutting stereo was to show that this one receiver can pick up two channels simultaneously, which is difficult with conventional receivers," said Holloway, who explained that although it is the early days for atomic communications, there is potential to use this to improve the security of communications.

For now, Holloway's team are staying tuned into atomic radio as they try to determine how weak a signal the Rydberg atoms can detect, and what data transfer speeds can be achieved.

They are not forgetting the atomic record they want to produce, with which they hope to inspire the next generation of quantum scientists.

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