

**REMARKS BY FCC CHAIRMAN AJIT PAI
AT THE FCC QUANTUM INTERNET FORUM**

DECEMBER 15, 2020

Good morning, and welcome to the FCC's first-ever Forum on the Quantum Internet! Thanks to everyone watching online today. Special thanks to our expert panelists and speakers. And, of course, there can't be a forum on quantum technology without acknowledging those who sparked my interest in this topic: Bill and Ted. Did you think I would say Scott Bakula?

Speaking seriously about pioneers who brought us to this point, today's forum is almost perfectly timed. Yesterday was the anniversary of Max Planck's seminal paper on quantum theory. On December 14, 1900, Planck published groundbreaking research theorizing that radiant energy was made up of particle-like components that he called "quanta." 120 years after he expanded our understanding of science beyond classical physics, we've gathered to discuss the quantum Internet—a new frontier of technology that promises to expand what is possible with classical computing and networks.

Now, I'm not even going to attempt to explain the difference between bits and qubits, or to describe entanglement. That's why Dr. Awschalom and our other experts are here. But I would like to take a moment to put today's proceedings into what I hope is useful context.

The first thing I would stress about the Quantum Internet is that this has to potential to be a really, really big deal.

I know many people first had their interest piqued in this topic in the summer of 2019, when Google announced that it had achieved "quantum supremacy." I think the most common reaction to those headlines was, "I have no idea what that means, but it sounds really cool." And indeed it was. Google claimed that, using quantum computing, they could now solve a problem in 200 seconds that the world's fastest classical supercomputer would need 10,000 years to figure out. Now, some argued that Google was presenting its findings in the most favorable light. After all, IBM, which had built the fastest classical computer, claimed that its machine could solve the problem in 2-and-a-half days. Regardless, objective third parties generally agreed that Google's computer was a real breakthrough: a computer that could fit in your bedroom could complete a task in a fraction of the time of a classical supercomputer, which is the size of two basketball courts. It proved that quantum computing can complete tasks that classical computing can't match. And other companies have since come forth with their own claims of breakthroughs in quantum computing.

By applying the laws of quantum physics to make calculations, we're entering a place we've never been before, and doing things computers have never done before.

Quantum networks promise to unleash this power by enabling distributed quantum computing and giving us a level of computational clout far beyond what is possible with today's Internet. This would be an incredibly powerful tool for solving complex problems and enabling scientific discoveries.

To be clear, leveraging quantum computing and communications at scale is still a long way off—likely more than a decade away. But that shouldn't obscure the technology's upsides.

For instance, when we think about the possible benefits of the Quantum Internet, the first big advancements we are likely to see involve network security. A quantum-secured communication link could offer foolproof security for data communication. If the link has been eavesdropped or tampered with, the sender will know this with 100% certainty. Development of a practical, secure, high data-rate quantum link offers major advantages in global competitiveness.

If my first point was that the Quantum Internet is a big deal for scientific research and economic development, my second is that the Quantum Internet is a big deal for the U.S. government. Federal

leaders from the White House to Congress have identified U.S. leadership in quantum as a national priority. In 2018, Congress passed and the President signed into law the National Quantum Initiative Act in order to accelerate the development of quantum information science. The Department of Energy has been working aggressively to implement parts of the law, and has a plan in the works to connect all 17 DOE national laboratories as the backbone on the Quantum Internet. The National Science Foundation is launching its own Quantum Center to complement the Energy Department's. The White House Office of Science and Technology Policy announced on October 7 the launch of [Quantum.gov](https://www.quantum.gov), the official website of the National Quantum Coordination Office, and the release of the Quantum Frontiers Report, which identifies key areas for continued quantum information science research. And as the nation's expert agency on communications technology, the FCC is proud to support these efforts.

The last key point I'd like to make today is that realizing the promise of the Quantum Internet will require a group effort. Government buy-in and leadership is essential, but it's not nearly enough. We need the committed engagement of America's leading research universities, which are the best in the world, not only to push the science forward but also to help train a skilled workforce. And we will need the private sector to develop applications and services using this technology. That's why I am so excited that the FCC is hosting this Forum today. We have gathered experts from around the country, representing academia and government as well as large and small companies, for a stimulating conversation about this next frontier of network technology. Today, you will hear from them and learn more about quantum's potential importance to communications networks. I expect this Forum will foster greater understanding about the quantum Internet of the future and highlight ways the public and private sectors can cooperate to ensure American success in this area.

Earlier, I noted how December 14 is an important day in history because of the publishing of Max Planck's breakthrough paper. Yesterday, we got a new reason to remember the date December 14 for years to come. Shortly after 9:00 AM, a healthcare worker at Long Island Jewish Medical Center in Queens received the first shot in America's mass vaccination campaign, a historic turning point in the battle against the coronavirus pandemic. Sequencing the virus and starting vaccinations programs in less than a year—a process that has historically taken 5 to 7 years—is one of the greatest scientific achievements of all time. For the purposes of today's discussion, I think it's worth noting that we made history because of a public-private partnership—Operation Warp Speed. Certain tasks are so monumental that they demand that government, the private sector, and academia work together. That was certainly true for developing a vaccine in record time. And I believe that is also true of this effort to revolutionize communications and information processing. Today's Forum tells me that we've built the coalition we need, and we are up to this new challenge.

Thanks again to everyone for participating. Special thanks to all the members of the FCC staff who have worked to put this event together, especially the Commission's Chief Technology Officer Monisha Ghosh. Now, to borrow a line from Matt Damon in "The Martian," let's go science the bleep out of the Internet.