

Ultra-Fast “Photonic Chip” Achieves [📄]44.2 Tbps Internet Speed Record

Just how fast is that? You could download the entire 55-disk set of Disney classic movies from 1937–2018 (Blu-ray format) in 2.05 seconds.

Impossible you say? At today’s current commercially available internet speeds, it is impossible. But two Australian universities (RMIT and Monash) successfully collaborated to produce an internet download speed of 44.2 Tbps using a photonic chip called a microcomb [1].

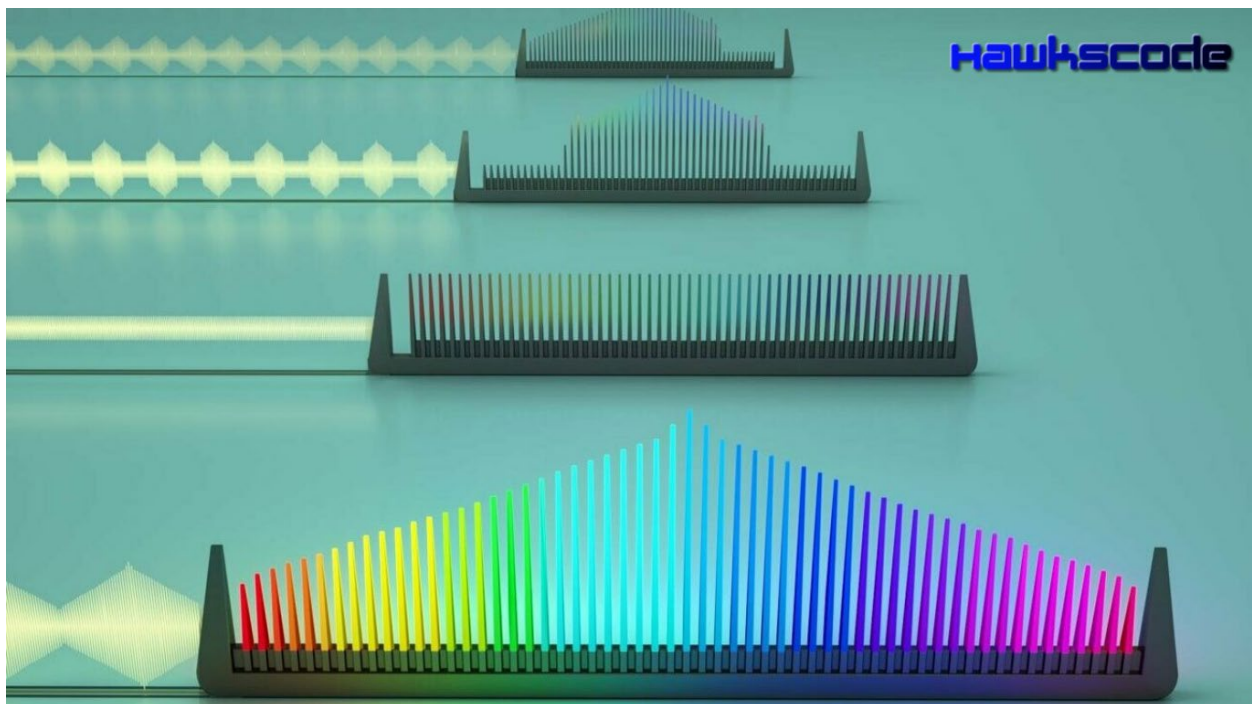


Figure 1. Photonic microwave generation using on-chip optical frequency combs. Image sourced from <https://news.easysiksha.com/photonic-microwave-generation/>

How does it work?

The basic idea is that the chip sends signals like a beam of light but shifts the light into frequencies much like the different colors of the rainbow. Like the different teeth on a comb, each tooth operates within its own spectrum and does not interfere with the other teeth. Each

color or band of light is an individual communication path and allows the chip to multitask extremely fast. The technical article can be found [here](#) [2].

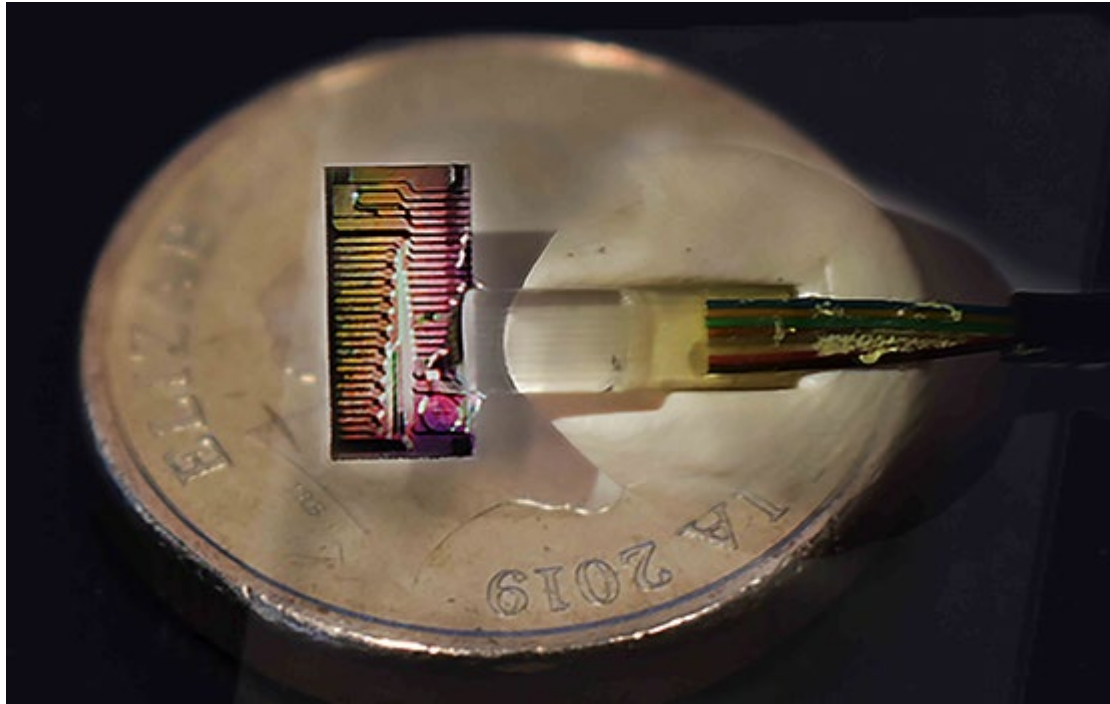


Figure 2. One of the micro-comb photonic chips, allowing download speeds of up to 44.2 Tbps. Image sourced from <https://newatlas.com/electronics/44-terabits-internet-photonic-chip/>

The team tested the chip technology using over 47 miles of fiber optic cable, installed between two university campuses in Melbourne, Australia. They were able to transmit data at 44.2 Tbps.

Exactly how fast is 44.2 Tbps?

That speed is unheard of so let us compare it to something more familiar. What is fast or high-speed internet today? According to the FCC, 25 Mbps or higher is required to be classified as high-speed or fast broadband [3].

Internet speeds (typically measured when downloading data) fall into three categories[4]:

1. Basic – 3 to 8 Mbps
2. Average – 12 to 25 Mbps
3. Fast – 25 Mbps and higher

I ran a speed test on my internet connection using three different online speed test services (1) Google, (2) Speedtest.net, and (3) Fast.com. The average of all three indicated that I have a fast internet connection of 45 Mbps.

At that speed it takes almost 13 minutes to download a standard 4GB HD movie. A 4K UHD Blu-ray movie can be as large as 50GB and that would take 2 hours and 40 minutes to download.

How about an actual example?

With that in mind, what if my internet speed was 44.2 Tbps? We have to do some the math [4]:

Tbps = Terabits per second

GBps = Gigabytes per second

GB = Gigabyte

$44.2 \text{ Tbps} = 5657.6 \text{ GBps}$

$5657.6 \text{ GB} \div 4\text{GB (the size of an HD movie)} = 1,414 \text{ downloaded movies per second.}$

$5657.6 \text{ GB} \div 50\text{GB (the size of a 4K UHD Blu-ray movie)} = 113 \text{ downloaded movies per second.}$

Going back to my initial premise, Disney currently offers a 55-disk set of its classic movies from 1937 – 2018 in Blu-ray format. Assuming each disc is 50GB, **the entire box set is 2,750GB.**

Using my download speed today of 45Mbps, it would take 139 hours to download—almost **6 full days.**

If the download speed were 44.2Tbps, the entire collection could be downloaded in **2.05 seconds.**

Wow – that is fast!

References used in this article:

1. <https://blog.giddyup.io/ultra-fast-photonic-chip/>
2. <https://www.sciencedirect.com/science/article/pii/S0370157317303253>
3. <https://broadbandnow.com/report/fcc-broadband-definition/>
4. <https://www.advancedconverter.com/unit-conversions/digital-storage/terabits-to-megabits>