A new type of optical gyroscope could allow mobile devices to shrink even further.

Technology is becoming increasingly smaller. This trend can be seen in devices recently covered by Springwise. These include a sensor that can fit on a tooth and a robot the size of a molecule. Now, researchers at CalTech may have found a way to shrink gyroscopes.

Gyroscopes can be found in almost every piece of mobile technology in use today. Gyroscopes were originally made up of nested wheels, each spinning on a different axis. Most vehicles, drones, and electronic devices use a modern type of gyroscope called microelectromechanical sensors (MEMS). These measure changes in the forces acting on identical masses that are moving in opposite directions. Optical gyroscopes are much more sensitive than MEMs, but are bigger than a golf ball. Researchers in the CalTech High Speed Integrated Circuits Group have recently developed a new optical gyroscope that is not only much more efficient than the current state-of-the-art device, but is also 500 times smaller.

In standard optical gyroscopes, a beam of light is split into two, and the twin beams travel in opposite directions along a circular pathway, before meeting at a light detector. Because light travels at a constant speed, rotating the device causes one of the two beams to arrive at the detector before the other. This phase shift, called the Sagnac effect, is used to calculate orientation. The new gyroscope uses a technique called ‘reciprocal sensitivity enhancement’. This filters out any interference and allows the light to travel through miniaturised optical waveguides on a chip smaller.
than a grain of rice. By reducing the background 'noise', the system can work with weaker signals, which allows the miniaturisation.

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Email: mchen1@caltech.edu
Website: www.chic.caltech.edu
Contact: mchen1@caltech.edu

**Takeaway:**
If it can be produced commercially, the Caltech miniature gyroscope could allow most mobile devices to shrink considerably. They could also potentially be used to incorporate gyroscopes into a wider range of devices. What other uses could there be for a miniature gyroscope?