

New invention that could change design of future memory storage devices

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A research team at Singapore A*STAR's Data Storage Institute (DSI) has invented a new phase change material that has the potential to change the design of future memory storage devices.

Phase change materials are substances that are capable of changing their structure between amorphous and crystalline at high speed. Currently, these materials are used to make Phase change memory (PCM), the most promising alternative to replace FLASH memory.

This research advance was given special mention in *Nature's Asia Materials* journal. In the August issue of *Nature Photonics* journal, another DSI research achievement -- the creation of a needle of longitudinally polarized light in vacuum using binary optics – is featured.

Conventionally, PCM is worked by changing phase change materials' structure through applying an electric current. Now, phase change might be effected by means of switching the new phase change materials by using magnetic fields.

The DSI research team led by Shi Luping, Ph.D., created this first phase change magnetic material by introducing iron atoms into Germanium-Antimony-Tellurium alloys (or GeSbTe) containing non-magnetic elements.

"The addition of magnetic properties to phase change materials opens doors to possible new applications, such as the possibility of integrating

phase change memory into spintronic technology [also known as magnetoelectronics], and positions it as the next generation of storage technology to look out for," said Chong Tow Chong, Ph.D., DSI Executive Director.

Research is underway to develop materials that could be switched by application of magnetic fields. Said Dr. Shi, "As a next step, we will explore phase change spintronics and its applications. Because of the new degree of freedom of spin we introduced, the possible applications include novel devices with multiple functions, such as memories, sensors and logic devices."

Source: Agency for Science, Technology and Research (A*STAR), Singapore

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