**Magnetic Skyrmion: A quasiparticle that can reproduce like a living cell and its application in data storage.**

Skyrmions are topologically stable field configuration of a certain class of non-linear sigma models.

Magnetic Skyrmion is skyrmion made up of whirls and vortices if magnetic poles that form lattices within a magnetic material. It is a quasiparticle which means it is an emergent phenomenon. It occurs in materials when pushed by electric current.

Magnetic skyrmions are promising hopes of next gen data storage technology since they are cheaper, faster and smaller. They can be used as bits to store information in memory and logic devices as it allows for existence of discrete magnetic states.

Skyrmions were observed to be stable at lower temperatures and also affected by external magnetic fields. However Lin Zhou, Ames Laboratory Scientist and team of others on their recent investigation on FeGe, Iron-Germanium a magnetic material has found that this compound can demonstrate skyrmions in highest temperature ranges in crystals with B20 or similar structure.

Ames Lab scientists with external collaboration established a skyrmion lattice in a sample through exposure to magnetic fields and super cooling with liquid nitrogen. Lorentz transmission electron microscopy (L-TEM), was used to observe the skyrmion lattice in zero magnetic field. The decay of the skyrmions was observed as the temperature raised. This observation led insight on information about skyrmions behavior and revert to a 'normal' (metastable) magnetic state.

"We've stabilized these skyrmions without a magnetic field, and our microscopy techniques allowed us to really see how the vortices change over time, temperature, and magnetic field; we think it provides a very solid foundation for theorists to better understand this phenomenon," Zhou said.

Similarly it has been found that this quasiparticles grow and evolve from the conical phase in the same ways that real nanocrystals form from vapors or solutions. However individual skyrmions can also “reproduce” by division in a mitosis-like process that allows them to remove lattice imperfections, which is not available to crystals made of mass-conserving particles.

Refernces:

<https://en.wikipedia.org/wiki/Magnetic_skyrmion>

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