The Night Sky By Eric Erickson

Offered Title: Of Sauerkraut and Strings

Sauerkraut is kind of amorphous, and to me, it is intriguingly tasty. It has *je ne sais quoi*…an indescribable quality. So does string theory.

Einstein had his theory of relativity, the grand mechanism (gravity) governing our universe. Max Planck, Niels Bohr, Werner Heisenberg, and others developed their theory, quantum mechanics, the mechanisms governing sub atomic space. These two camps made a significant but unsuccessful effort to meld these mechanisms into a single, elegant theory of everything. Then came string theory.

Born in the 1960's, string theory became an exciting concept that held promise for integrating quantum mechanics and relativity. So, string theory can be thought of as quantum gravity theory. String theory goes beyond classic sub atomic particles and fields into an even smaller realm. How small? Very small, on the order of 10^{-35} meters (the Planck length), and these strings (according to string theory) form the basis of elementary particles such as bosons and fermions. Strings are one dimensional vibrations of varying configuration (length, open or closed loop, and vibration state). A theorized particle, the graviton – responsible for carrying gravitational force, is predicted in string theory. Just as with other elementary particles, its nature is defined by strings.

This all kind of makes sense in an amorphous way. Now it gets weirder.

Over time string theory evolved into five competing theories called superstring theories, that seemed to produce opposing results when the same data is introduced. Some of these theories also described the same phenomenon differently. That was considered a significant problem for string theory until 1995, when Edward Witten suggested the five theories were simply five limiting cases within a bigger theory. He gave this broader theory a name, M-theory. M-theory has 11 spacetime dimensions, including the normal four: length, width, height, and time. The additional dimensions might arise from different forms of gravity and time. With M-theory, again the hope is to describe everything based on strings. The M stands for, well, that hasn't been decided. It could be membrane, magic, or maybe mystery. The theorists involved with M-theory will decide what M means, if and when string theory bears fruit. Even with M-theory, string theory is dynamic and there remain several competitive ideas.

Weirdest of all…after 5 decades' string theory is still purely mathematical. There are no instruments sensitive enough to measure or detect any of its predictions, so no supporting evidence. Patience grasshopper.

What's in the Sky?

Saturday, March 4th.

Get out your telescope, spotting scope, or strong binoculars. A nearly first quarter Moon will occult the bright star Aldebaran, alpha (α) Tauri. Set up early, at or before 9:30 pm CST to witness this event as it will occur at 9:44 pm CST. Aldebaran will be occulted by the unlit limb so it will seem to just disappear. It reappears from behind the bright side a little more than an hour later, at 10:52 pm CST.