

The James Webb Space Telescope

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The James Webb Space Telescope launched last December will observe the oldest events and objects in the Universe from the formation of the first matter in the 'Big Bang' and the first stars and galaxies.

So far the telescope preparation is successful as it travels to its target destination in 4 to 5 months time. But are Australians prepared for this new knowledge? It would be encouraging if Australians had more background and the means to follow the project.

The project is a mixture of the largest scale astronomy over 10^{27} metres, Einstein's domain, with particle physics on the smallest scale. But here we still teach our children that matter is made of protons, neutrons and electrons orbiting the Bohr atom. In fact, the proton and neutron are each composed of three types of *quark* particles bound together by *gluons*. And electrons come in threes - the *electron*, *muon* and *tau* each with its own *neutrino*.

Here Australian scientist Helen Quinn educated at Tintern Grammar, Ringwood East, Victoria now at Stanford University USA postulated another new particle, the *Axion*, that has held sway since 1977. When the multitude of galaxies and matter in the universe is analysed, the mathematics shows there is theoretically not enough mass for it to hang together. About 27% percent of the mass ('*Dark Matter*') and 68 percent of the energy ('*Dark Energy*') is missing. In Quinn's theory the undetected *Axion* makes up the difference.

And matter may not be 'point' particles but tiny vibrating '*strings*' of length 10^{-35} metres. Any smaller is a quantum world where length no longer has meaning. The controversial mathematics of *String Theory* is most productive but without experimental verification yet.

Here's to the success and our understanding of the results of the James Webb Telescope.

Note:

- 10^{27} metres is 10 with 27 noughts after it.
- 10^{-35} metres is 1 divided by (10 with 35 noughts after it).