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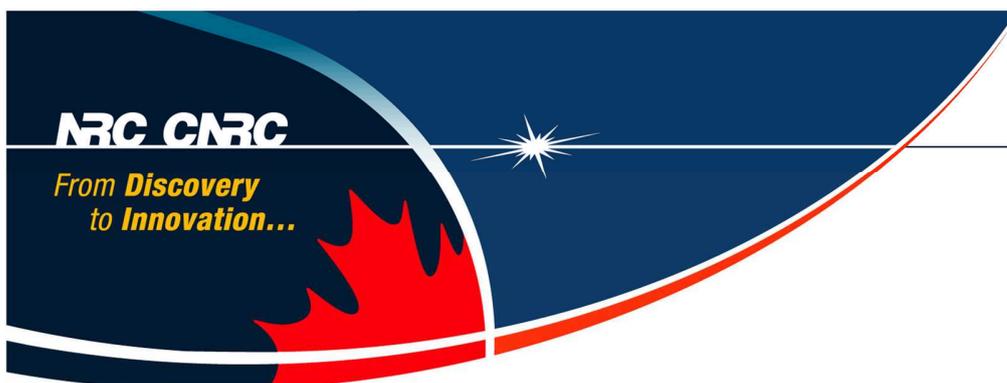
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## A NEW VIEW

**Ken Tapping, 28<sup>th</sup> July, 2009**

Ever since we first looked up at the sky, we have been trying to make sense of the universe we live in. On the basis of what we saw in the world around us, and on what we observed in the sky, we tried to build a “view” of the universe. However, as time passed, we found out new things. Sometimes these fitted into our view without too much difficulty. On other occasions it scuppered our old view completely, and our picture of the universe changed. This process is still going on.

Some new views of the universe came about because of the invention of new instruments, such as the telescope, or the radio telescope, or space observatories. Being able to observe things we could not observe before provides a lot of new information and raw material to build new theories. Another way our view of the universe can be turned upside down is when a clever person looks at the available data and the questions it has generated, and formulates new models and relationships, so that everything fits together more neatly. Next there is the case where a meticulous observer collects a lot of new data, and then makes it available to others, stimulating new ideas. Finally, there is the impact of simply collecting diverse data from many observers and then making it available to the whole community. This idea has grown into the facilities such as the Canadian Astronomy Data Centre. However, no matter what gave rise to it, a “new view” has to raise new questions and issues, which can be used to validate that view and lead us to new lines of research; otherwise it cannot be proved and is scientifically useless.

Over the centuries our view of the universe has been turned upside down many times. To describe

all of this would take a huge book or two, or... So this is just a sampling.

Pythagoras and others presented evidence that the Earth is a globe. Then Eratosthenes measured its size. Tycho Brahe made a vast set of meticulous observations, which in turn helped Copernicus show that the Earth and other planets orbit the Sun. Kepler expanded this work and developed the laws dictating how planets move. Then Newton formulated the concept of gravity, which made it possible to put it all on a firm physical and mathematical basis. Using Newton’s ideas we became able to model stars, planets and even to navigate the Solar System. Einstein built on the work of Newton and others to better explain the properties of space and time. Olbers showed the universe cannot be infinite, and Hubble and others showed it was expanding. Monseigneur Georges Lemaitre first proposed the big bang, which is now believed to have taken place 13.7 billion years ago, and Penzias and Wilson detected its fading breath. Then the COBE and WMAP satellites mapped it, showing the very beginnings of structure in the universe. However, with questions about dark matter, or whether the expansion of the universe is accelerating, and with new instruments coming on line, expect a new view...soon.

Jupiter rises about 10pm, with Neptune about 1.5 degrees to the Northeast. Saturn is low in the Southwest during the evening. Mars and then Venus rise in the early hours. The Moon will reach First Quarter on the 28<sup>th</sup>.

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