

## **Cosmology Section Annual report 2021**

The Cosmology section persists in its role of working as a clearing house for interesting papers related to large scale astrophysics.

The LIGO consortium continues to churn out regular detections of gravitational waves and has been complemented with the VIRGO interferometer in Italy. At least two other interferometers are under construction... and yet we seldom hear of these incredible feats. How easily bored is the human mind; how short is that 15 minutes of fame.

As a result, two themes have largely dominated astrophysics over the past year - Fast Radio Bursts and the possible early detection of a fifth force in Nature.

Until the CHIME radio telescope came on line, fast radio bursts were seldom detected. As was experienced with LIGO and gravitational waves, having an appropriate instrument has turned FRB detection from an annual event into an almost daily occurrence. As an example, see the first CHIME FRB catalog. <https://arxiv.org/pdf/2106.04352.pdf> FRB's are still not understood but there seems to be progress. Well, maybe. Research is really hard.

The possible detection of a fifth force of nature is a huge event in physics and may allow explanations for everything from the matter-antimatter imbalance following the Big Bang to dark matter and its undetectable interactions. In spite of the efforts of thousands of researchers, these phenomena have defied explanation since the 1930's. Humanity may well be on the brink of a deeper understanding of the Universe. Or it may not. Inspired, hard work - doubtless rewarded with several Nobel prizes - will be needed for many years yet. We continue to live in interesting times.

To close, I'd like to express my thanks to all the members of the ASSA Cosmology Group and to Case and Maciej in particular for their frequently stimulating ideas.

Bruce Dickson - Director