

**Report of July 2012 Meeting
Royal Society
Southern Highlands Branch**

Speaker: Professor Brian Schmidt
2011 Nobel Prize Winner
Laureate Fellow at the Australian National University
Mount Stromlo Observatory.

Topic: The Accelerating Universe

Professor Brian Schmidt opened his lecture to thunderous and prolonged applause as he stood before a huge audience of 200 - 250 people at the Chevalier College Performing Arts Centre, Burradoo, on the evening of July 19. People from all walks of life had come for this extraordinary event. Noticeable in the crowd were numerous senior physics and science students from the College itself.

Brian Schmidt was introduced to the audience by Mr Hubert Regtop, President of the branch. He described Brian's early life, his raising in Montana and Alaska USA, and his undergraduate degrees in Physics and Astronomy from the University of Arizona in 1989. Under the supervision of Robert Kirshner, Schmidt completed his Masters degree in astronomy in 1992, and his PhD from Harvard University in 1993. In 1994, he and Nick Suntzeff formed the High-Z SN Search team, a group of 20 astronomers on 5 continents who used distant exploding stars to trace the expansion of the Universe in time.

In 1998, two teams, Saul Perlmutter's from the Supernova Cosmology Project, and the High-Z Supernova Search team led by Brian Schmidt and Adam Riess, traced back the expansion of the universe over billions of years. They expected to find that the expansion was slowing down, but instead they found it was speeding up. The startling discovery was made that more than 70% of the cosmos is contained in a previously unknown form of matter called Dark Energy. Schmidt's lecture described this discovery and explained how astronomers have used observations of the most powerful explosions in the Cosmos to trace our universe's history back more than 13 billion years, leading them to ponder its ultimate fate.

In his very detailed and cleverly presented lecture, Schmidt described how he and his team had used Type 1a supernovae, which are individual stars, to measure the Universe. Supernovae are simply stars that explode, but as there is more than one way for a star to explode, there are different types of supernovae. Type 1a supernovae are the explosions of white dwarfs. This is the pinnacle that only a few stars like our sun are able to achieve. White dwarf stars are not made of iron, instead they are composed of carbon and oxygen,

so there are still substantial amounts of nuclear energy left in their atoms. As the white dwarf begins to collapse against the weight of gravity, the material is ignited, and rather than collapsing further, this nuclear blast wave consumes the star in a second, creating an explosion 10 to 100 times brighter than Type II supernovae.

At the end of the lecture and the questions that followed, Brian Schmidt was kind enough to pose with groups of senior students for photographs that will inspire them for many years. He had just completed an exhausting tour of USA with all the fanfare and demands made on Nobel Prize winners, and had come directly to the Southern Highlands from delivering the Dirac lecture earlier in the day in Sydney. Although he had still to get back to Sydney after the Southern Highlands lecture, he gave his time generously to the students – a wonderful act of advocacy for the sciences and scientific careers.

Anne Wood