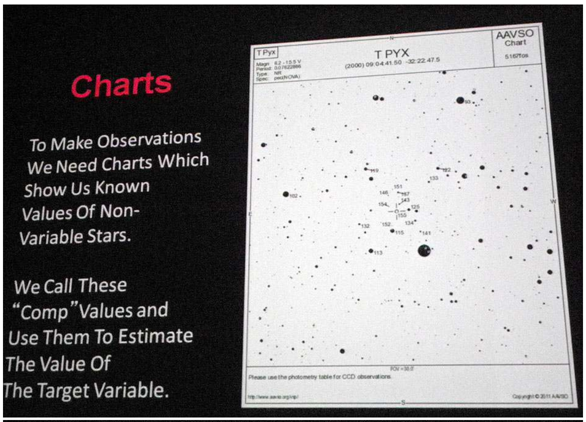
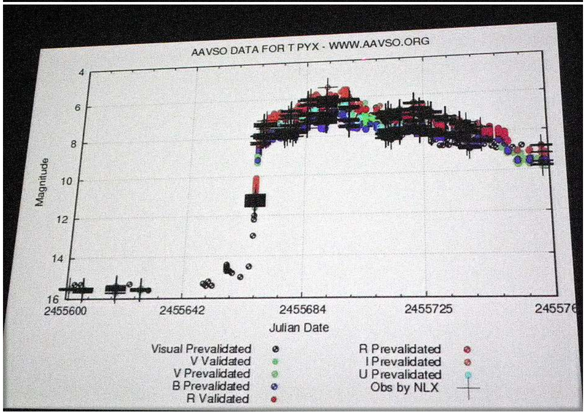
Peter Nelson, Director Variable Star Section, presents ?Variable Star News”

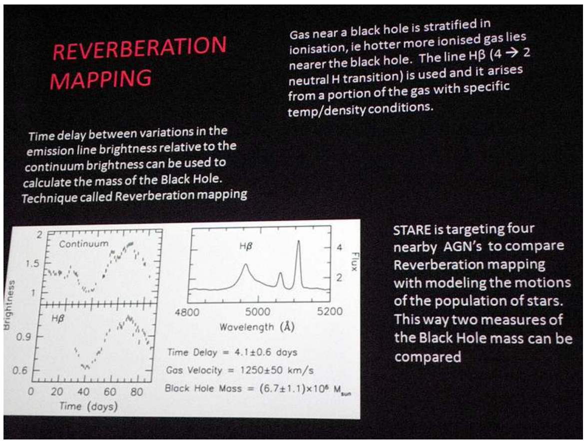
?Understanding variable star behaviour sheds light on other astronomical phenomena”. In any research it is the abnormal that lets us study and focus on what we call ?normal”. Fundamentally all stars do vary in brightness, Peter says, even our Sun varies within 0.1 and 0.2%. Observing and studying the range of eccentricities of variable stars gives us a better understanding of what makes stars ?tick”.



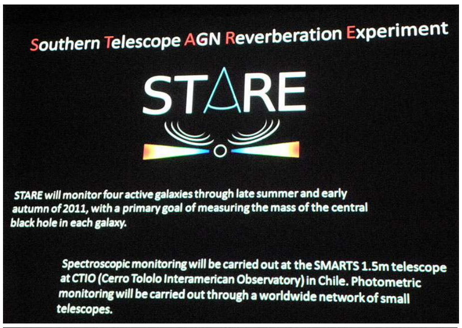
Variable stars fall into two basic groups: Intrinsic and Extrinsic. The first group include the Pulsating Variables, where the changes in light output are caused by expansion and contraction of the star’s atmosphere, like the Miras and the Cepheids. The second includes eclipsing binaries and symbiotic stars, the cataclysmic and eruptive variables like nova and supernova.

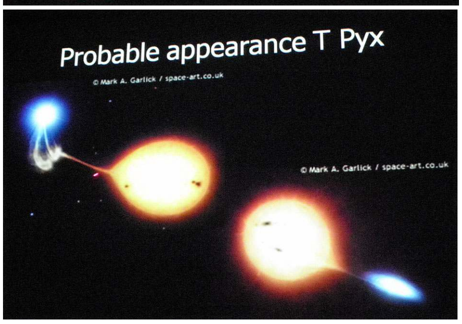


Peter gave some helpful hints on getting started in variable star observing with modest equipment: your eyes, charts, binoculars or telescope, which can cover a large number of stars down to 0.1 magnitude variations. His favourite example is his friend Rod Stubbings, who currently holds the word record (nearly 200,000 observations) to his name. And he warns of the pitfalls in CCD photometry monitoring, with tracking errors, filter problems, reduction software and calibration frames. Talking about his current projects, Peter becomes almost lyrical with his cryptic definitions of T Pyx monitoring (it is thought to approach the Chandrasekhar limit, with the potential to erupt as a Type 1a Supernova anytime), V1312 SCO 25 April nova evolution, and monitoring AGN for the STARE project. Professor Brad Schafer, a specialist in recurring Nova and currently writing a paper on the activities of T Pyx (see Data), can assist with information to its observations.



The ever expanding field of Variable Star observations now includes even Black Holes and Gamma Ray Bursts. By this time though, we are long past casual visual observations, we are talking about dedicated telescopes, expensive cameras, exotic software and internet connections. Most GRBs come from the edge of the observable Universe and can only be detected by specialised satellites. These powerful rays are believed to be the result of jets ejected by collapsing stars or black holes. The extreme nature of gamma rays makes it difficult to pin-point their source, but quite often the outbursts are accompanied by a faint visual component that can be detected on Earth, which then allows exact positioning. Whenever a new GRB is detected (sometimes daily) the hunt is on to find its visual component. The long-term aim is to develop automated pointing ability, virtual observatories, alerts of the Net and automated schedule interruption to monitor transient events. Black holes, of course, can not be seen directly. But again there are ways to detect and located them indirectly. Usually found at the centre of galaxies, they affect the orbits and the behaviour of nearby stars. These tell-tale effects, monitored over time, give out the exact location and mass of the suspected Black Hole. Even in distant galaxies, where stars can no longer be identified individually, the average motion of population stars can be measured and give limits to the size of the Black Hole. A method called Reverberation Mapping, where the time delay between variations in the emission line brightness relative to the continuum brightness is used to calculate the mass of the black hole in Active Galactic Nuclei.





Variable Star Observing certainly has come a long way in the last few years. AK