THICK STELLAR ‘DISC-COVERY’

School of Physics astronomer, Professor Geraint Lewis, is part of a team of international astronomers who have identified a thick stellar disc in the nearby Andromeda galaxy for the first time. The discovery and properties of the thick disc will constrain the dominant physical processes involved in the formation and evolution of large spiral galaxies like our own Milky Way. By analyzing precise measurements of the velocities of individual bright stars within the Andromeda galaxy using the Keck telescope in Hawaii, the team have managed to separate out stars tracing out a thick disc from those comprising the thin disc, and assess how they differ in height, width and chemistry.

Spiral structure dominates the morphology of large galaxies at the present time, with roughly 70% of all stars contained in a flat stellar disc. The disc structure contains the spiral arms traced by regions of active star formation, and surrounds a central bulge of old stars at the core of the galaxy. From observations of our own Milky Way and other nearby spirals, we know that these galaxies typically possess two stellar discs, both a ‘thin’ and a ‘thick’ disc,” explains the leader of the study, Michelle Collins, a PhD student at Cambridge’s Institute of Astronomy. STORY CONTINUES OVERLEAF

WISE WOMEN WANTED

The International Women in Science and Engineering (IEEE-WISE) Conference from 23-25 March 2011 will provide an opportunity to discuss women’s roles in innovative technology in the 21st century across the engineering, technological and science professions while providing great networking possibilities between national and international counterparts, academia, government and industry sectors. The conference will highlight the important role that women, such as the School’s ARC Federation Fellow, Professor Marcela Bilek, pictured, play in the digital, technical and scientific worlds. The IEEE-WISE conference will provide ample opportunity for questions towards our expert panels in each of the following areas; Science, Resources, Logistics, and Supply Chain, Technology, Web 3.0, Engineering, Skills shortages: 21st century strategies, Women, Technology and the Law, Environment and Sustainability, Health, Resources, Leadership.

Dates: Wed. 23, Thurs. 24 & Fri. 25 March 2011
Time: 8am-11pm (Including meals and evening dinners)
Venue: Perth Convention & Exhibition Centre
Register: ieee-wise@debi.edu.au.
Program: ieee-wise.debi.curtin.edu.au

The IEEE-WISE is hosted by the Digital Ecosystem and Business Intelligence Institute, a division of Curtin University and jointly supported by Women in Technology (QLD), IEEE Women in Engineering and the Chief Scientist of WA, Professor Lyn Beazley.

CUDOS LAUNCH

The ARC Centre of Excellence, CUDOS, will be launched by Senator The Hon. Kim Carr, Federal Minister for Science, at CUDOS - Faster, Smarter, Greener on Wednesday 6 April in MacLaurin Hall from 3.00pm-6.30pm (includes reception). Registration’s essential - book now for this free event at: sydney.edu.au/science/cudos-launch.php
ISS2011 - LIGHT & MATTER

Applications are now open for the ISS2011. The ISS combines around 150 of the world’s top young scientists, a dozen leading researchers across a wide range of fields, and a very exciting bunch of volunteer staff for a packed two weeks at the University of Sydney. From 3-16 July 2011 the School of Physics hosts the 36th Professor Harry Messel International Science School (ISS) for talented Year 11 and 12 high school students from Australia, China, India, Japan, Malaysia, Singapore, New Zealand, Thailand, the UK and the USA for a fortnight of science talks, experiments, activities and excitement.

The main feature is always the series of talks by leading scientists, and this year the students will meet Sir John Pendry of Imperial College, London, renowned for his work on invisibility cloaks. This isn’t some mere Harry Potter-esque magic show; Sir Pendry works with metamaterials, so carefully engineered that they have bizarre properties — including invisibility! Then students will get a glimpse of the very earliest moments of the universe after the big bang with Prof. Allan Clark from the University of Geneva. Prof. Clark works on the ATLAS detector Large Hadron Collider in Switzerland, the world’s largest particle accelerator, where particles collide at energies higher than we have ever seen on earth to explore the very smallest scales of matter.

Dr Christine Charles, head of ANU’s Plasma Research Laboratory, will introduce the students to the most abundant form of material in the universe, the stuff of stars and the beautiful northern and southern lights: plasmas. She will show the vast range of plasma applications, from fluoro lights to microchips, hydrogen fuel cells and even plasma space engines. The talk series will also feature home-grown researchers from the University of Sydney, Prof. Ben Eggleton will talk about his team at the Centre for Ultrahigh Bandwidth Devices for Optical Systems, who are creating fibre optics and light-based computers for the future of communications and IT. Geoscientist Dr Jo Whittaker will show how her work on plate tectonics can reconstruct the shape of our world in the distant past. And in this, the International Year of Chemistry, Dr Deanna D’Alessandro will speak on doing her bit for the planet through research into 3D chemical structures that capture greenhouse gasses. This is just a sample of the amazing research and inspiring scientists our ISS students will encounter at ISS2011. When they’re not absorbing science in the lecture theatre, the students will be running around campus with GPS units on a Geosciences treasure hunt, or taking eye-popping images with the Electron Microscope Unit, or designing airships, breaking codes and modelling power grids with the Science and Engineering Challenge. And when they are done with science for the day, each evening they can take part in a wide range of social activities, from movie and games nights to the famous ISS Sydney Harbour Cruise.

ISS2011 applications close Friday 1 April 2011.

For more info: www.physics.usyd.edu.au/foundation/iss/iss.shtml or contact:

Dr Chris Stewart on +61 2 9351 3722 or email c.stewart@physics.usyd.edu.au

THICK STELLAR DISC... CONTINUED FROM PAGE ONE

“The thick disc consists of older stars whose orbits take them along a path that extends both above and below the more regular thin disc. “The classical thin stellar discs that we typically see in Hubble imaging result from the accretion of gas towards the end of a galaxy’s formation, whereas thick discs are produced in a much earlier phase of the galaxy’s life, making them ideal tracers of the processes involved in galactic evolution.”

Currently, the formation process of the thick disc is not well understood. Previously, the best hope for comprehending this structure was by studying the thick disc of our own Galaxy, but much of this is obscured from our view. The discovery of a similar thick disk in Andromeda presents a much cleaner view of spiral structure. Andromeda is our nearest large spiral neighbor — close enough to be visible to the unaided eye — and can be seen in its entirety from the Milky Way. Astronomers will be able to determine the properties of the disk across the full extent of the galaxy and look for signatures of the events connected to its formation. It requires a huge amount of energy to stir up a galaxy’s stars to form a thick disc component, and theoretical models proposed include accretion of smaller satellite galaxies, or more subtle and continuous heating of stars within the galaxy by spiral arms.

“Our initial study of this component already suggests that it is likely older than the thin disc, with a different chemical composition” commented UCLA Astronomer, Mike Rich. “Future more detailed observations should enable us to unravel the formation of the disc system in Andromeda, with the potential to apply this understanding to the formation of spiral galaxies throughout the Universe.”

“This result is one of the most exciting to emerge from the larger parent survey of the motions and chemistry of stars in the outskirts of Andromeda,” said fellow team member, Dr. Scott Chapman, also at the Institute of Astronomy. “Finding this thick disc has afforded us a unique and spectacular view of the formation of the Andromeda system, and will undoubtedly assist in our understanding of this complex process.”

This study was published in Monthly Notices of the Royal Astronomical Society by Michelle Collins, Scott Chapman and Mike Irwin from the Institute of Astronomy, together with Rodrigo Ibata from L’Observatoire de Strasbourg, Mike Rich from University of California, Los Angeles, Annette Ferguson from the Institute for Astronomy in Edinburgh, Geraint Lewis from the University of Sydney, and Nial Tanvir and Andreas Koch from the University of Leicester.