

ICRAR & ICRAR-Pawsey Summer Studentships 2016 - 2017 Project Proposal

Project Details	
Project Title	How is matter distributed in the 'Universe'?
Primary Supervisor	Weiguang Cui
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Additional Supervisors & Contact Details	Chris Power Chris.power@uwa.edu.au
Additional Resources Required	None
Student Location for project	UWA
Project Description	Understanding matter in the Universe and how it is distributed is one of the most important questions in astronomy. The next generation telescope, such as the Square Kilometer Array (SKA) will reveal more details of the gas distribution as well as its evolution from high to low redshift. However, we can only theoretically investigate this question currently. With the most advanced hydro-dynamical simulations, we will study the distribution of different matters. These theoretical investigations will put an advanced understanding to this and will help us to estimate the expectations for next generation telescopes.
Student Attributes	
Academic Background	Basic knowledge of astronomy and statistics
Computing Skills	Knowing one of the programming languages. Having experience of Linux system would be better, but not required.
Training Requirement	Knowledge for supercomputer system, but not necessary.
Project Timeline	
Week 1	Understanding the numerical simulations
Week 2	Knowing the data structure of the simulation snapshots
Week 3	Training for reading in the snapshot data
Week 4	Learning the software paravt for density estimation
Week 5	Calculating the density probability distribution function (PDF) for test simulation
Week 6	Calculating the PDF for dark matter in galaxy clusters
Week 7	Calculating the PDF for baryonic matters

Week 8	Understanding the changes of the PDF for different materials
Week 9	Writing a short paper for this study
Week 10	Writing the PPT for this study
	Final Presentation