

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

Project Details	
Project Title	Galaxy transformation from early- to late-types
Primary Supervisor	Kenji Bekki
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Additional Supervisors & Contact Details	Rob Basset (until early Feb 2017)
Additional Resources Required	N/A
Student Location for project	UWA
Project Description	Galaxy shapes are broadly divided into two categories; Early-type (elliptical; 'E') galaxies and late-type (spiral; 'Sp') ones. Two spiral galaxies can merge to form one elliptical galaxy. But what would happen if one elliptical galaxy merges with one spiral galaxy? In this project, students investigate galaxy transformation processes during merging between elliptical and spiral galaxies using computer simulations of this particular type of galaxy merging. In particular, students will investigate in which physical conditions of 'E-Sp' merging a new disk galaxy can be formed. The simulated distributions and kinematics of gas and stars will be compared with corresponding observations of peculiar disk galaxies. Students do not need to be familiar with computational astrophysics, because the code and the model for the proposed simulations will be provided for students. Students just need to run a simulation (i.e., 'push the button') on mini-supercomputers at ICRAR to get the results.
Student Attributes	
Academic Background	Physics or astrophysics
Computing Skills	If students have some experiences of using software for data analysis (e.g., Mathematica), it is great
Training Requirement	Not required
Project Timeline	
Week 1	Setting up of merger simulations at ICRAR UWA
Week 2	Performance of computer simulations of E-Sp mergers
Week 3	The same as above
Week 4	Analysis of simulations data (I) Gas distribution
Week 5	Analysis of simulation data (II) Stellar kinematics
Week 6	Analysis of simulation data (III) Residual star formation
Week 7	Investigation of parameter-dependences of the above (I)-(III)

Week 8	Comparison between simulations and observations (mostly from SAMI data)
Week 9	Discussion on the consistency between observation and simulations
Week 10	Writing a report (if possible a paper)
	Final Presentation