

The interaction of the Magellanic clouds with the Milky Way

Dr Bi-Qing For, University of Western Australia, 2014

The studies of the Magellanic System (our nearest extragalactic neighbours) provide us with an understanding of how galaxy accretion and interaction influences the evolution of galaxies. This project has allowed a clearer understanding of this interaction and has paved the way towards an even better understanding in the future, once the Australian SKA Pathfinder (ASKAP), currently being constructed in Western Australia, becomes available for science observations. The project utilized neutral hydrogen (HI) observations from the Galactic All-Sky Survey (GASS) and a newly conducted survey with the Australia Telescope Compact Array (ATCA). We discovered a new population of clouds that forms the fourth “arm” of the Magellanic System as well as a new diffuse bridge-like feature connecting the other two “arms”. The studies also reveal other features in greater detail than before. The results helped clarify the relative contributions of ram pressure stripping and tidal forces in the Magellanic System. Other detailed achievements of the Fellow include:

- Chair of the Local and Scientific Organising Committees for an international workshop SIEF John Stocker Postdoctoral Fellowship – Milestone report 2, 3 or Final related to the Magellanic system. The meeting was held in Perth, Western Australia from 10–13 September, 2012.
- A successful observing proposal for follow-up high-resolution observation of specific regions of the Magellanic Leading Arm was submitted to the Compact Array. The data was successfully collected and analysed. A paper is in preparation.
- A study of gas and star formation in the Circinus galaxy was made. This project employed data from the Spitzer space telescope (infrared), the Australia Telescope Compact Array (radio), the Parkes telescope (radio) and the Swedish-ESO Sub-millimeter Telescope (sub-mm).
- Participation in an observing run at the Parkes telescope to gain hand-on experience in radio observations.
- Simulation of ASKAP BETA observation of the Large Magellanic Cloud.
- Simulating of ASKAP-12 observations and examination of its capability for Magellanic System observations.
- Membership and participation in the international VISTA Magellanic Clouds survey (VMC). The fellow leads one of the stellar cluster projects.
- Award of a UWA Research Collaboration Award grant to establish new collaborations in China and Argentina. The collaborations allowed the Fellow to exchange ideas and learn new survey analysis techniques.
- Mosaic of ATCA Magellanic Stream survey data and combination with single-dish data from the Parkes Galactic All-Sky Survey.
- Scientific management of the MWA GLEAM survey data query interface.
- Analysis of new data from the MWA relating to the Magellanic System.