

Honours Project 2024

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Innovative visualization techniques to visualise and investigate (HI) data cube and multi-parameter data-sets

Background: The IDIA Visualization Lab <https://vislab.idia.ac.za/> has produced a science-ready software that uses “virtual reality” (VR) technology to visualise and interact with Radio (e.g. MeerKAT or ASKAP) data cubes (iDaVIE-v - <https://idavie.readthedocs.io/>) and multi-parameter multi-wavelength catalogues (iDaVIE-p) from a unique immersive perspective. The system has already paid dividends with discoveries since its first beta release in 2021 (e.g., Gyula et al. 2021 or, more recently, Glowacki et al. 2024). A number of international groups are adopting the system to explore data coming from the SKA Pathfinders. The Lab is further developing and expanding the VR capabilities, as well as lead the international research effort in this field of innovative scientific visualization, as we move into the MeerKAT-Plus and SKA-Mid eras.

Aims & Objectives: The project will involve the student’s contribution to one or more aspect of the iDaVIE development such as, but not limit to, e.g. help implementing new feature(s) part of the iDaVIE development pipeline, learn how to use the iDaVIE-v and iDaVIE-p software for scientific exploitation, contribute to design and implement an iDaVIE *demo* that will accompany the software release to the public. The project will involve both programming tasks and scientific understanding of the visualised data and community requirements. The project here presented at the Honours level can then be continued as a Master’s project.

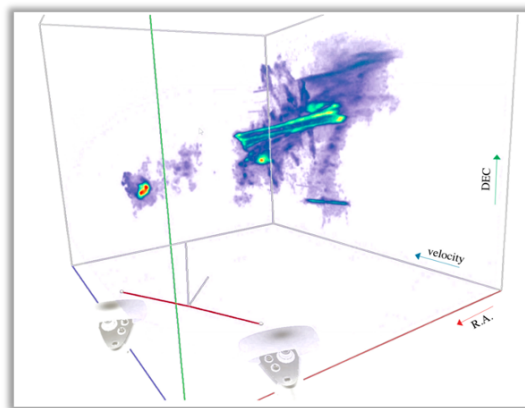


Figure 1: HI data cube visualised with iDaVIE-v (Jarrett et al. 2021)

Background requirements:

Some background in C#, C++ and Unity would be highly advantageous, but not mandatory.

Supervision team:

The student will be supervised by Dr Alexander Sivitilli (postdoc and lead developer in the IDIA Vislab), Dr Lucia Marchetti (Director of the IDIA Vislab) at the University of Cape Town and will work in close collaboration with the iDaVIE development team.

References :

Please visit for a complete list of relevant literature: <https://vislab.idia.ac.za/research>