Immersive Analytics in Astronomy

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ASTRONOMY AND SPACE SCIENCE www.csiro.au



"Immersive Analytics"?

"Immersive Analytics is an emerging research thrust investigating how new interaction and display technologies can be used to support analytical reasoning and decision making."

Chandler et al. (2015)



"Immersive Analytics"?





Big displays: Many of them!





Pietriga et al. (2016)



Big displays: Do we really need them?



Meade et al. (2014)



Big displays: Do we really need them?





Collaborative workspaces (DWF)



Credit: Dark Energy Survey Collaboration

Andreoni & Cooke (2018)



Collaborative workspaces (DWF)





Collaborative workspaces (DWF)





Spectral datacubes



Credit: C.Harrison



Large-scale 3D spectroscopy surveys





Large-scale comparative visualisation (encube)





Large-scale comparative visualisation (encube)



Vohl et al. (2016)



The WALLABY survey

- Widefield ASKAP L-Band Legacy All-Sky Blind Survey (WALLABY)
- HI survey of nearby galaxies
- ASKAP telescope
 - Murchison Radio-astronomy Observatory (WA)
 - ➤ 36 x 12-m dishes
 - ➢ FoV: 30 square degrees
 - ➤ Spatial resolution: 30"/10"
 - Spectral resolution: 4 km/s
 - Bandwidth: 300MHz (16384 channels)
- Coverage: -90 degrees to +30 degrees
- Expected 500,000 galaxy detections
 - 5000 spatially resolved with "good" resolution





The WALLABY survey



Credit: J.Rhee

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The WALLABY survey



Kleiner et al. (in prep)



Galaxies can be strange



Yun et al. (1993)



Galaxies can be strange ...really strange!





ES0223-G009 (ATCA HI data)

Koribalski et al. (2017)



LVHIS Galaxy



3D (spatial) + 3D (velocity) visualisation?





Koribalski et al. (2017)



Credit: C.Gheller & K.Dolag



Questions instead of answers!

- Does the outcome justify the cost and effort?
 Can we quantify it?
- Should we focus more on outreach?
 - > Video games?
 - Citizen science?





- Other means of immersion?
 - ➤ Haptics?







Collaboration, Collaboration, Collaboration





