MSE and SKA

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Timelines

- 1991: SKA concept conceived
- 1993: International SKA working group set up
- 2000: First SKA MoA signed
- 2006: SKA shortlisting of potential sites
- 2010: MSE original concept (ngCFHT) proposed
- 2011: SKA Organisation becomes a legal entity
- 2012: SKA site selection (Australia + South Africa)
- 2012: MSE (ngCFHT) Feasibility Study
- 2014: MSE Project office established
- 2017: MSE Construction proposal phase finishes
- 2018-2024: MSE construction
- 2018-2023: SKA Phase I construction
- 2020: SKA early science
- 2024: MSE operations
- 2023-2030: SKA Phase 2 construction
Key science areas

SKA
- Cradle of life
- Cosmic dawn
- Cosmic magnetism
- Strong-field tests of gravity
- Galaxy evolution and cosmology

MSE
- Milky Way (stellar, structure)
- Galaxy evolution (early + late)
- Black holes
- Cosmology
- IGM
SKA Phase 1

- Three primary Phase 1 science goals: EOR, pulsars and HI.
- MSE+SKA1 galaxy evolution science will extend to higher redshift work currently being pursued by the Taipan and ASKAP/WALLABY surveys.
- Taipan+WALLABY: Galaxies in transformation at low-z \((z<0.1)\).
- MSE+SKA1: Galaxies in transformation up to \(z<1\).
SKA1 HI Science

- Galaxy evolution through resolved HI kinematics and morphology of $10^{10} \, M_\odot$ galaxies to $z<0.8$.

- High spatial resolution studies of the ISM in the nearby Universe.

- Multi-resolution mapping studies of the ISM in our Galaxy.
SKA1 Pulsar science

- Survey using SKA1 LOW, increase known pulsars by order of magnitude.
- Timing for testing GR and gravity wave detection, using SKA1 MID.
SKA1 EOR science

- Imaging: Detect and characterise ionised structures and HI brightness temperature fluctuations on 5’-300’ scales, over 6<z<28 to 1 mK brightness temperature level.

- Power spectrum: Detect and characterise 21cm power spectrum with S/N ~ 100 over scales of 0.2<k<1 Mpc⁻¹ over 6<z<28.
Summary

❖ Opportunities to build close links between MSE and SKA Organisation to facilitate joint key science goals.

❖ SKA Key Science is being developed and refined as the instrument construction becomes more of a reality.

❖ Good time to begin high-level discussions that define how interaction between the two organisations and facilities can progress.