The 4MOST facility is a spectroscopic survey facility running full time with many science cases observing simultaneously. This creates unique opportunities for both large surveys as well as for low target density surveys spread all over the sky. 4MOST is currently in a conceptual design selection phase together with MOONS (a smaller field IR MOS for the VLT), with a decision in Spring 2013.

**Science drivers**

**Milky Way: Gaia follow-up**

The 4MOST instrument complements Gaia in key areas where it lacks spectroscopic capabilities. Performing a large survey of faint Galactic stellar objects with 4MOST will determine the 3D Galactic potential and its substructure, measure the Galactic assembly history through chemo-dynamical substructure and abundance pattern tagging, determine the dynamical structure of the Milky Way and measure the influence of its bar and spiral arms, and find thousands of extremely metal-poor stars to constrain early galaxy formation and stellar evolution.

**Cosmology: Euclid follow-up**

Constraints on Dark Energy properties and Galaxy Evolution will also be obtained through redshift surveys, especially for Euclid. 4MOST is also the ideal follow-up facility for other all-sky, space-based observatories of prime European interest: Gaia, eROSITA and Euclid.

**Requirements and specifications**

- **4MOST** shall be able to obtain:
  - radial velocities of ±2 km/s accuracy of any star observed by Gaia: R~5000 spectra of 19 mag stars, S/N=10 per Ångström
  - abundances of up to 15 chemical elements: R~20000 spectra of 16 V-mag stars with S/N=140 per Ångström
  - redshifts of AGNs and galaxies (also in clusters): R~5000 spectra of 22 r-mag targets with S/N=5 with >3 targets in e=2

**Instrument**

- Wide-field Corrector with 2.5s degree diameter field-of-view for the VISTA telescope.
- Echidna-style positioner based on proven technology allows high fibre density and rapid reconfiguring. The spectrographs will be located on the telescope fork resulting in a short fibre routing and high efficiency.

**To determine feasibility of the science goals the 4MOST Facility Simulator (IF5) was created that simulates the full performance based on Design Reference Surveys (DRSs), key programs that define the instrument requirements the most. Each DRS has a full science input catalog that is simulated through a throughput and noise simulator (top right), a tie fibre assignment routine (left), an observation scheduling simulator (bottom right), and analyzed using a data quality software to produce survey figures-of-merit.**

**Consortium**

**Instrument Institutes**

Leibniz-Institut für Astrophysik Potsdam (AIP) (D)
MPI für Extraterrestrische Physik, München (D)
Ludwig-Maximilian Universität, München (D)
Zentrum für Astronomie, Univ. of Heidelberg (D)
Institute of Astronomy, Cambridge University (UK)
Rutherford Appleton Laboratory, Oxford (UK)
L’Observatoire de Paris, GEPI, Paris (F)
NOVA, Dwingeloo (NL)
ESO, Garching (EU)

**Science Institutes**

University of Lund (S)
University of Uppsala (S)
University of Groningen (NL)