

The Heterodyne Instrument for FIRST

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The Heterodyne Instrument for FIRST, *HIFI*, has been optimised to address astronomical key questions that require high spectral resolving powers and sensitivity. These studies range from planetary atmospheres, comets, collapsing molecular clouds forming new stars and planetary systems, stellar winds associated with dying stars, the origin and evolution of the general ISM, galactic nuclei, to nearby and distant dusty galaxies.

The instrument is designed to have the following capabilities:

- continuous frequency coverage from 480 to 1250 GHz in five bands, while a sixth band will provide coverage for 1410-1910 GHz,
- an instantaneous bandwidth of 4 GHz analysed in parallel by two types of spectrometers: a pair of wide-band spectrometer (WBS), and a pair of high-resolution spectrometer (HRS) providing
- resolving powers up to 10^7 (300 – 0.03 km/s)
- detection sensitivity close to the theoretical quantum noise limit.