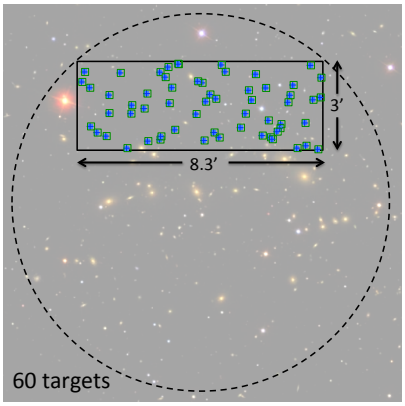
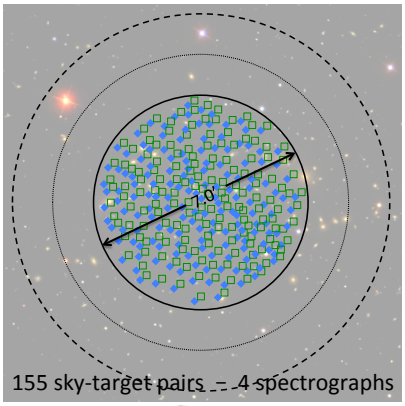
Wide Field Optical Spectrograph - WFOS
Architecture Downselect
Slit based monolithic - versus - fiber-fed modular

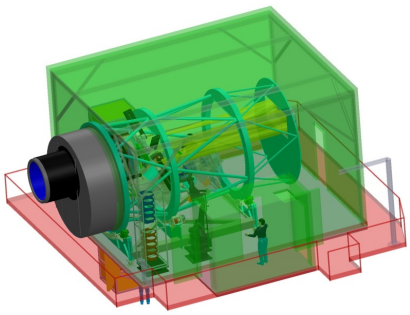
Key Science areas driving the designs:
- IGM/CGM tomography and characterization
- Stellar populations throughout the local group
- High redshift galaxy evolution
- Transient science

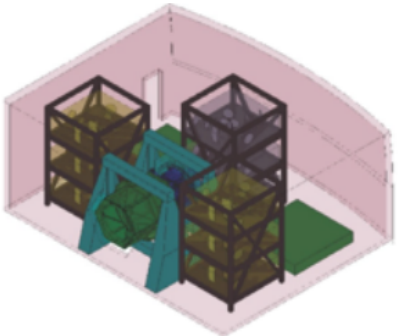
Xchange-WFOS

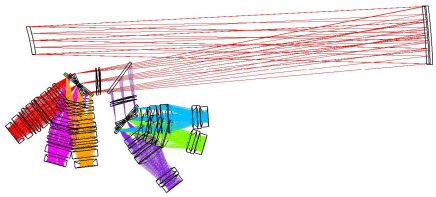


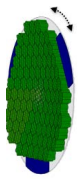
Fiber-WFOS - baseline 4 spectrographs

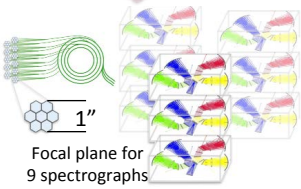












Context: WFOS is a first light instrument. The 2016/2017 OMDR phase concluded that the previous concept had insurmountable technical challenges. During the OMDR and WFOS Conceptual Design 1 phases, fiber and reconfigurable (Xchange) spectrograph architectures were developed (2017/2018).

Top: Illustrations of the sampling of the TMT focal plane for the Xchange (far left) and fiber fed forms of the WFOS instrument when sky nodding. 7′ diameter field is for 4 modular spectrographs with 22″ pitch, 100% overlap fiber positioners.
Left: Xchange-WFOS instrument design concept (upper) and optical layout (lower) showing articulated camera positions for high spectral resolution modes.
Right: Modular Fiber-WFOS instrument design concept showing the full potential 9 spectrographs and 700 fiber collectors over 10′ field (baseline is 4 spectrographs).

Background subtraction with Fibers
Analysis shows that for observations lasting many hours, requiring sky subtraction precision of 0.1%, negligible fiber systematics are expected when sky-nodding.

	Xchange-WFOS	Fiber-WFOS
Spectral resolution	Baseline 1500 – 5000, grating dependent	Fixed 3500 to 5000. Binning for lower resolution
Limiting magnitude	~24.1 g(AB) in **1hr S/N=5**	~24.0 g(AB) (Compare to 22.1 for GMOS)
Wavelength coverage	0.31-1.0µm continuous at R=1500. 40nm in the blue, 140nm in the red at R=4500	0.31-1.0µm continuous at R=5000

https://www.ucolick.org/home/facilities/instruments/wfos.html

Principal investigator: Kevin Bundy
Project scientist: Chuck Steidel (Caltech)
Project manager: Maureen Savage (UC Observatories)
Cross partnership development team

Downselection process and timeline:
- Technical review 4/5 April, 2018 – Concluded all architectures are technically feasible
- Re-assessment of top level WFOS science requirements by SAC, using community input – 26 July, 2018
- Downselect to single architecture – Early October 2018