

# Keck and TMT Instruments and Upgrades

Inverse chronological order by commissioning dates

## Keck instruments and optics delivered:

- MOSFIRE (2012): Caltech & UCLA/IR Co-PIs, UCSC/UCO (optics and guider)
- Keck-I laser guide star (2010): WMKO
- SHARC (2006): UCLA/IR PI (engineering camera; retired)
- OSIRIS (2005): UCLA/IR PI
- Keck-II laser guide star (2004): LLNL/UCSC PI, WMKO
- Interferometer (2004): JPL, MSC, WMKO Co-PIs
- DEIMOS (2002): UCSC/UCO PI
- NIRC-2 (2001): Caltech PI, UCLA/IR (electronics)
- LRIS-Blue side (2000): Caltech PI
- Keck-I natural guide star AO (2001): WMKO PI
- NIRSPEC (1999): UCLA/IR PI
- ESI (1999): UCSC/UCO PI
- Keck-II natural guide star AO (1999): WMKO & LLNL Co-PIs
- LWS (1996): UCSD PI
- Keck-II secondary (1995): UCSC/UCO PI
- HIRES (1994): UCSC/UCO PI
- NIRC (1994): Caltech PI
- LRIS-Red side (1993): Caltech PI, UCSC/UCO (optics)
- Keck-I secondary (1991): UCSC/UCO PI

## Keck instrument upgrades delivered:

- LRIS-Red detector upgrade (2010): UCSC/UCO PI
- Keck-I & II AO wavefront controller upgrade (2007): WMKO PI
- HIRES detector upgrade (2004): UCSC/UCO PI
- HIRES image rotator (1997): UCSD PI

## Keck instruments in progress:

- KCWI-Blue: Caltech PI, UCSC/UCO (optics and camera)
- NIRES: Caltech PI

### **Keck instrument upgrades in progress/under study:**

- OSIRIS detector: **UCLA/IR** PI, U Toronto
- Keck-I IR tip-tilt sensor (TRICK): **Caltech** PI, **WMKO**
- DEIMOS detector upgrade: **UCSC/UCO** PI

### **Keck Observatory facilities and augmentations delivered:**

- Center-launch Keck-II laser guide star (2012): **WMKO** PI, **UCLA/IR**, **UCSC/UCO**, UH
- MAGIQ guide cameras and software (2008-): **WMKO**, **Caltech**
- Keck-I atmospheric dispersion compensator (2007): **UCSC/UCO** PI
- Remote observing capabilities (2001): **UCSC/UCO** PI
- Keck Telescope phase control systems (1994,1996): **WMKO**, UCI, **UCSC/UCO**
- Keck Telescopes (1992, 1996): **UCSC/UCO**, Project Scientist

### **Next-generation Keck designs and proposals:**

- Keck I deployable tertiary (2012): **UCSC/UCO** PI
- NGAO (2007): **WMKO** PI, **UCSC/UCO** Project Scientist

### **Thirty-Meter Telescope and first-light instruments (not final):**

- TMT: **UCSC/UCO**, Project Scientist
- MOBIE: **UCSC/UCO** PI
- IRIS: **UCLA/IR** PI, **Caltech**
- IRMS: **UCLA/IR** PI, **Caltech**
- NFIRAOS: UBC PI