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Laser and Optical Subsystem for NASA's Cold Atom Laboratory JAMES KOHEL, JAMES KELLOGG, ETHAN ELLIOTT, MARKUS KRUTZIK<sup>1</sup>, DAVID AVELINE, ROBERT THOMPSON, Jet Propulsion Laboratory — We describe the design and validation of the laser and optics subsystem for NASA's Cold Atom Laboratory (CAL), a multi-user facility being developed at NASA's Jet Propulsion Laboratory for studies of ultra-cold quantum gases in the microgravity environment of the International Space Station. Ultra-cold atoms will be generated in CAL by employing a combination of laser cooling techniques and evaporative cooling in a microchip-based magnetic trap. Laser cooling and absorption imaging detection of bosonic mixtures of <sup>87</sup>Rb and <sup>39</sup>K or <sup>41</sup>K will be accomplished using a high-power (up to 500 mW ex-fiber), frequency-agile dual wavelength (767 nm and 780 nm) laser and optical subsystem. The CAL laser and optical subsystem also includes the capability to generate high-power multi-frequency optical pulses at 784.87 nm to realize a dual-species Bragg atom interferometer.

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