The Keck Planet Finder's Data Reduction Pipeline

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The Keck Planet Finder (KPF) Data Reduction Pipeline is a critical component of the KPF system, as reaching <50 cm/s performance requires a high-performance data reduction pipeline. The codebase was developed in a formal environment by professional software developers who collaborated with astronomers to develop the algorithms. It was built to be operated by the W. M. Keck Observatory and implemented using their Data Reduction Framework which handles the basic infrastructure of operations, logging, and bookkeeping. Data is automatically processed in real time as as spectra are read off the CCDs. Fully reduced spectra, RVs, and quick-look products that aid in observation planning and data quality assessment are available within minutes. We designed and implemented a creative and convenient approach to customizing and configuring pipeline operations without the need to understand the abstract class-based framework or touch the underlying code. The pipeline runs in Docker containers to maximize portability and ensure cross-compatibility with any major operating system. Docker also circumvents the need to maintain and test carefully-controlled build environments and makes installation trivial. The pipeline is open source and built from the ground up to be modular, extensible, and applicable to many high-resolution spectrographs. We hope that the community will begin to use the KPF DRP as the framework for future EPRV pipelines.