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Rubidium traced Etalon wavelength calibrators: towards deployment at observatories

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Precise wavelength calibration is a persistent problem for highest precision Doppler spectroscopy. The ideal calibrator provides an extremely stable spectrum of equidistant, narrow lines over a wide bandwidth, is reliable over timescales of years, and simple to operate. Unlike traditional hollow cathode lamps, etalons provide an engineered spectrum with adjustable line distance and width, and can cover a very broad spectral bandwidth. We have shown that laser locked etalons provide the necessary stability with an ideal spectral format for calibrating precision Echelle spectrographs, in a cost-effective and robust package. Anchoring the Etalon spectrum to a very precisely known hyperfine transition of Rubidium delivers cm/s-level stability over timescales of years. We have engineered a fieldable system which is currently being constructed as calibrator for the Maroon-X, Hermes, KPF, FIES and iLocater spectrographs.

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