

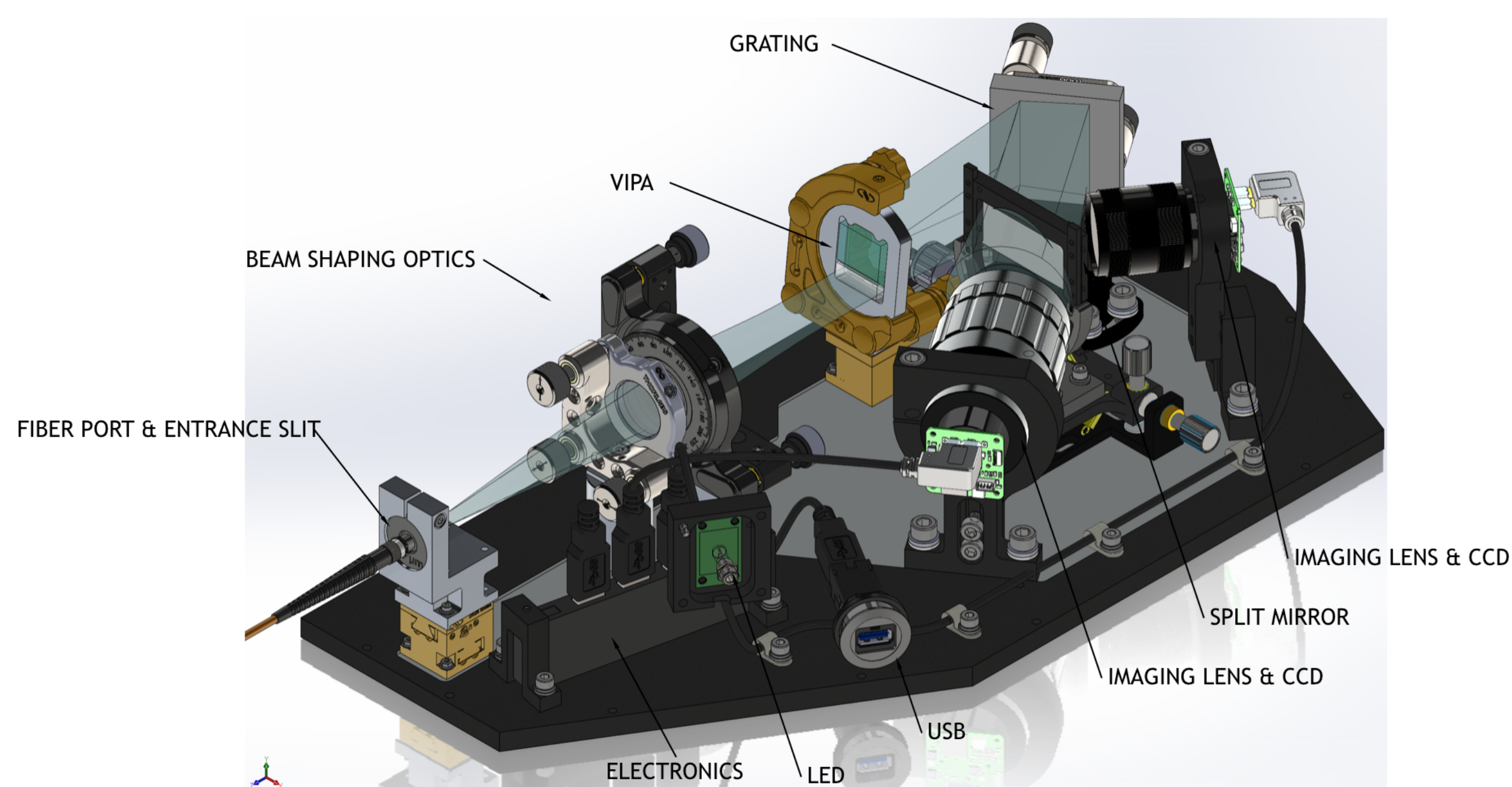


# HYPERFINE SPECTROMETER

Compact, Low Cost, Sub Picometer Resolution

The HyperFine series of spectrometers are based on LightMachinery's patented VIPA technology. Designed for measuring hyperfine spectra and subtle spectral shifts, the HyperFine spectrometer is a compact, low cost spectrometer capable of sub-picometer resolution. It is ideal for; measuring hyperfine spectra, laser characterization and the small spectral shifts from Brillouin scattering. Simple PC based software allows the user to review spectra in real time and save or export for more analysis. LabView drivers enable the HyperFine spectrometer to be integrated into automated experimental setups.

## How does it work?



Light enters the HyperFine Spectrometer through a fiber or directly imaged onto the slit. A VIPA etalon, manufactured using LightMachinery's proprietary fluid jet polishing technology, is used to produce very high dispersion in the vertical axis with sub picometer resolution. This is followed by a conventional grating to disperse overlapping orders in the horizontal direction and produce a 2D spectrum of the input light.

LightMachinery software unwraps the spectrum to produce an ultra high resolution wavelength spectrum of the input light. A secondary camera provides a wide wavelength range, lower resolution view of the spectrum.



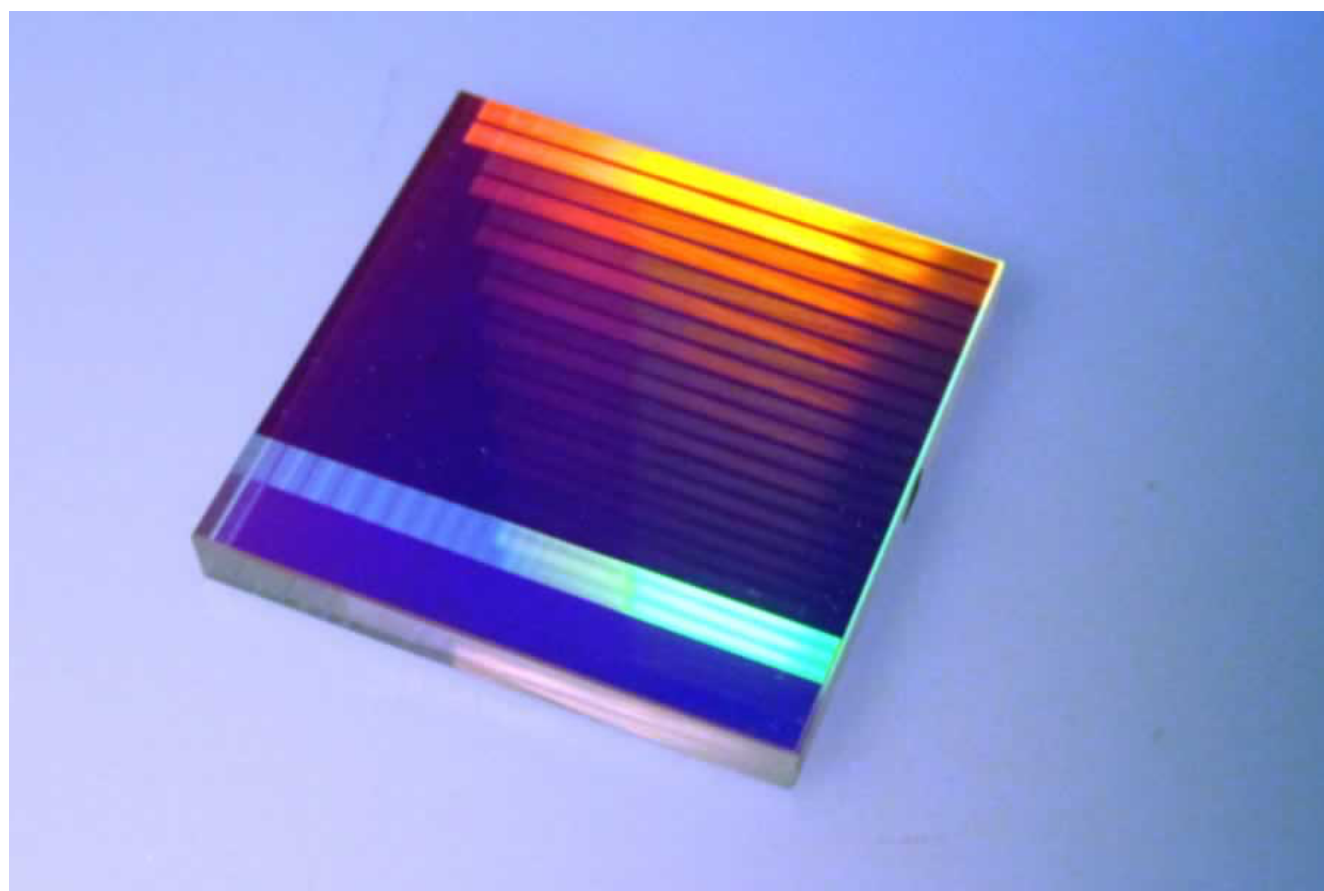
## Features

- Sub picometer resolution
- Fiber optic input or direct input
- Simple USB interface
- LabView Drivers
- No moving parts

## Benefits

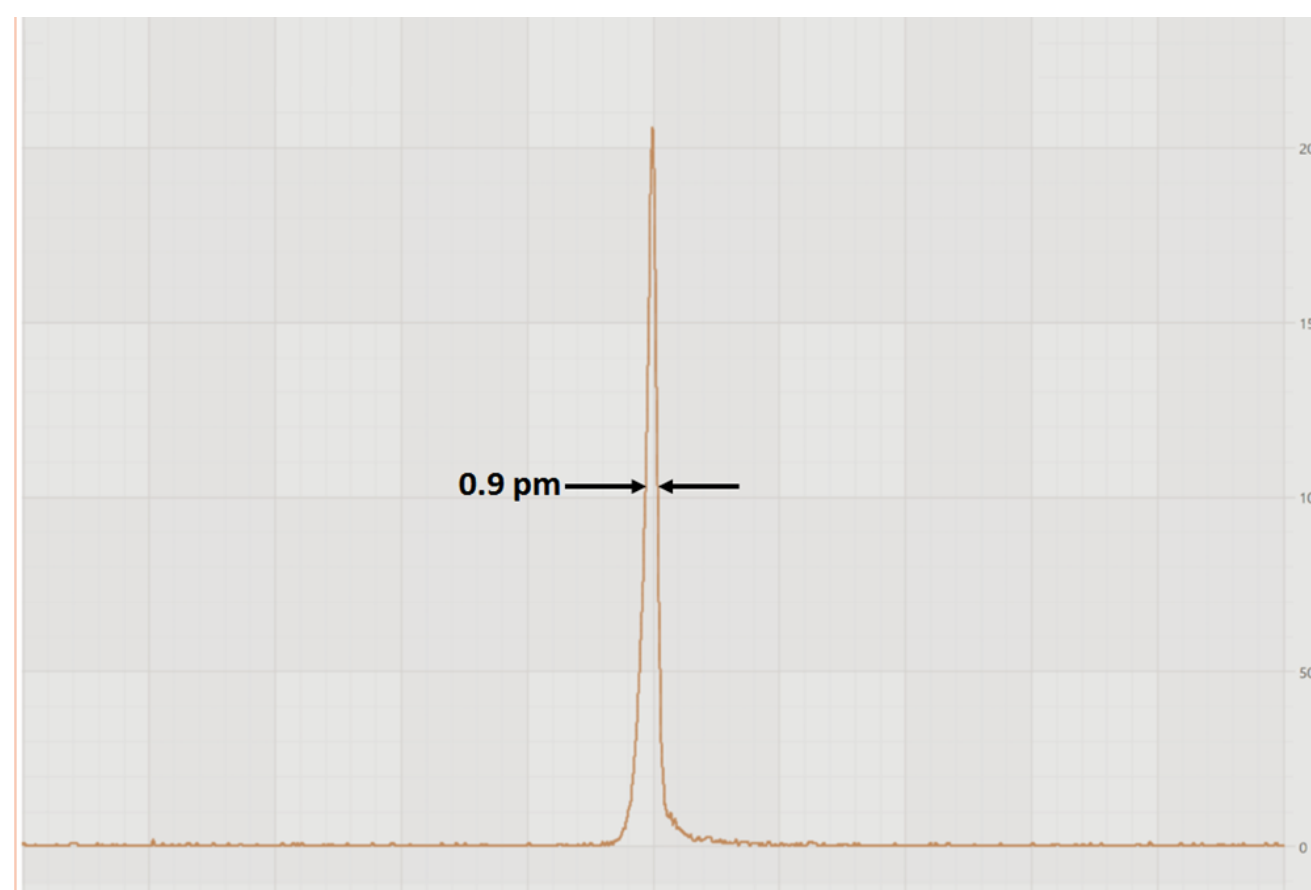
- Compact
- Low cost
- Can resolve hyper fine spectra below 1 picometer
- Ultra-reliable
- LightMachinery's legendary customer support

## Applications

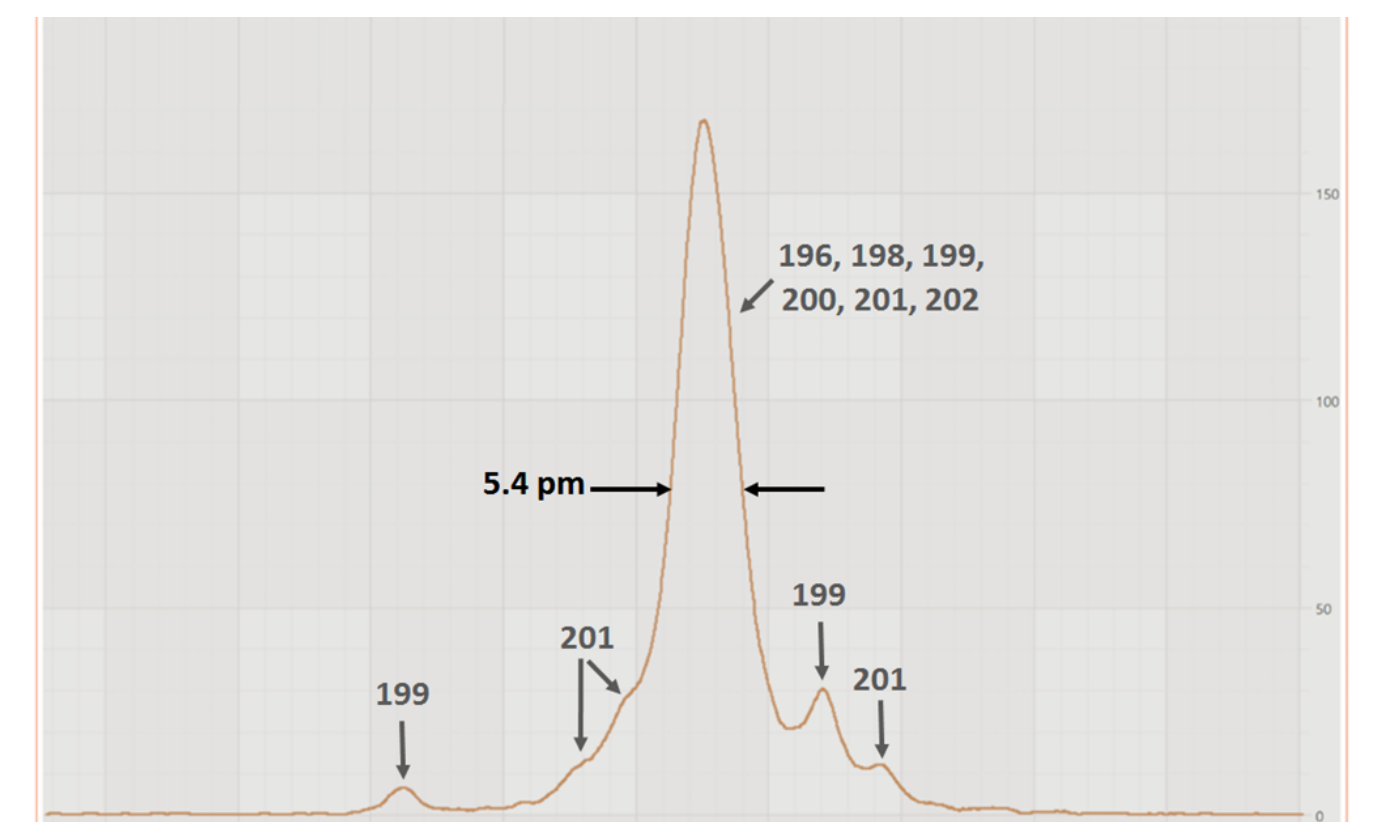


### VIPA Etalon

The engine of the HyperFine Spectrometer is the patented LightMachinery VIPA etalon. Our fluid jet polishing technology allows us to create surfaces of unmatched parallelism and perfection. Imagine a grating with 50x the dispersion.



Second harmonic of a single mode ytterbium-doped fiber laser.



Magnetic hyperfine structure of the 546.075nm mercury line (with isotope identification).

### Component Characterization

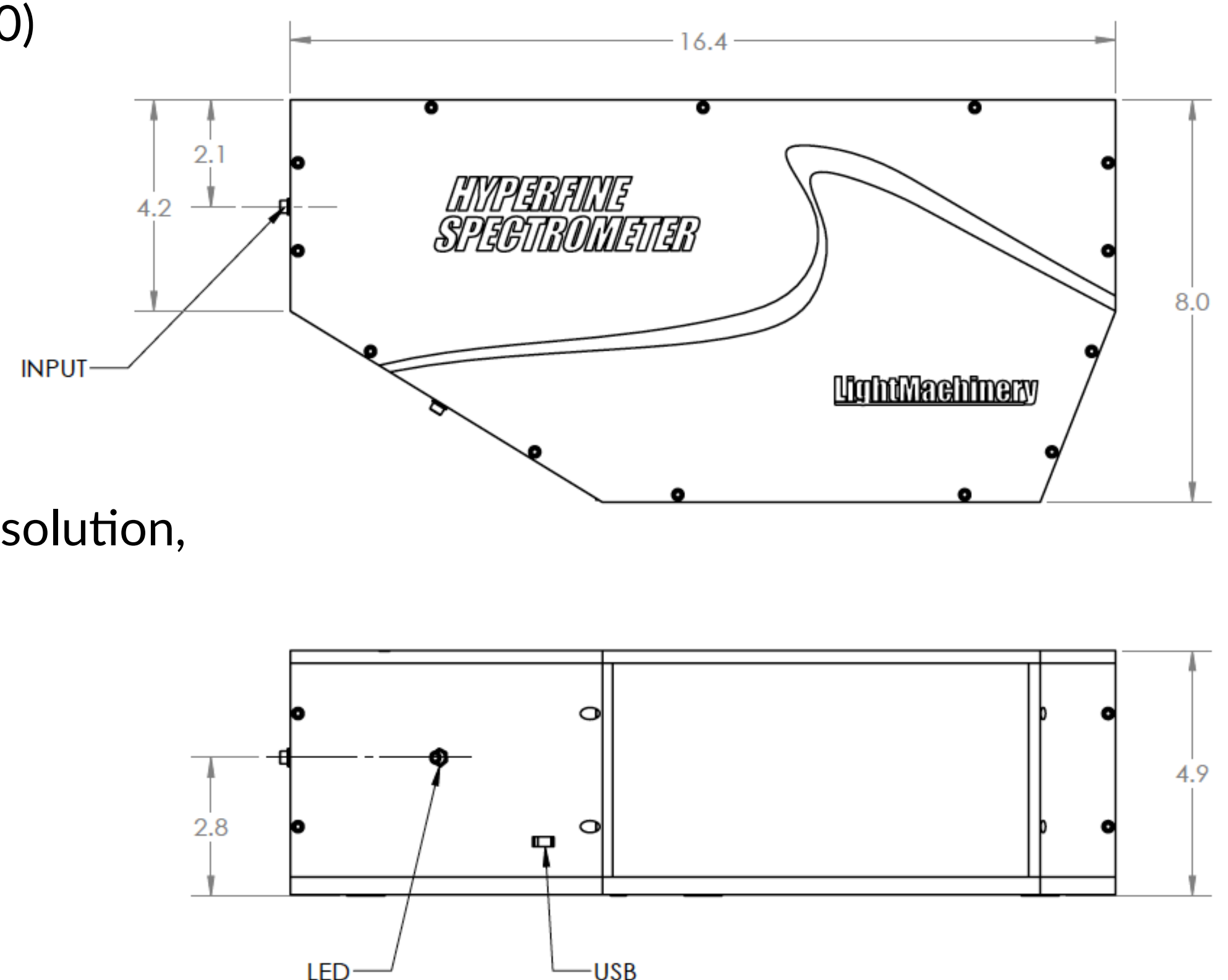
- Lasers of all types
- Super luminescent diodes
- Gas discharge lamps
- Passive components
- Filters
- Etalons
- Fiber Bragg gratings

### Spectroscopy

- Plasma spectroscopy
- High-precision gas spectroscopy
- Brillouin spectroscopy
- Spectral-domain optical coherence tomography

## Specifications

- Resolution: sub 1pm at 532nm (resolving power > 500,000)
- Accuracy: < 2pm following calibration
- Dynamic Range: >10<sup>6</sup> for the system, 256 in a single measurement
- Wavelength range 1: 10nm range with sub picometer resolution, user adjustable over 100nm
- Wavelength range 2: 100nm range with sub nanometer resolution, factory adjustable from 400nm to 700nm
- Simultaneous range / resolution: >10,000 at 532nm
- Acquisition speed: >2Hz typical
- Calibration: an external reference source is required



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