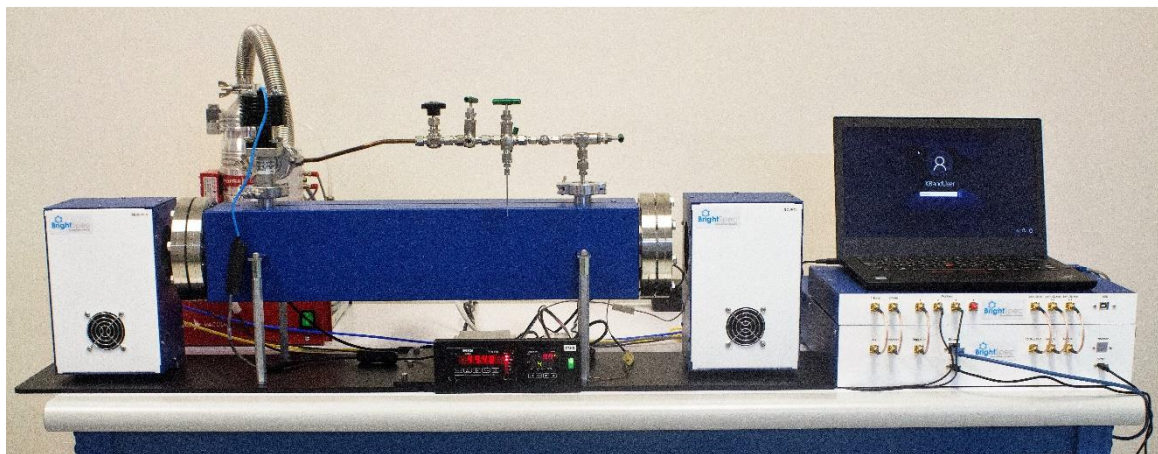


BrightSpec Discovery MRR Spectrometer *for Education and Fundamental Research*



Molecular Rotational Resonance (MRR) spectroscopy is a powerful tool for the investigation of chemical structure in the vapor phase. The BrightSpec Discovery MRR spectrometer is a benchtop instrument capable of performing high-resolution MRR measurements on low-pressure gas phase samples. The reconfigurable form factor allows users to integrate custom sample chambers, including pulsed and CW jet flows, for studies of complexes and transient species. The instrument includes the BrightSpec Edgar software for experiment setup, data visualization and processing, and spectral library comparisons. The instrument usability, capabilities, and cost make it suitable for incorporation into undergraduate teaching curricula.

Teaching Applications:

- Investigation of molecular structure
- Modeling of high-resolution rotational spectra
- Analytical characterization of gas and volatiles mixtures *and more*

Research Applications: *(with user-provided sample cells)*

- Structural investigation of higher-weight molecules (100-250 amu)
- Characterization of weakly-bound molecular complexes
- Characterization of transient species
- Molecular kinetics and dynamics *and more*

BrightSpec Discovery MRR Spectrometer

Specifications

Applications	Academic Research Educational Investigation Industrial and pharmaceutical impurity monitoring
Measurement Technique	Fourier Transform Microwave Spectroscopy
Frequency Range	18-26 GHz
Excitation Source	3-Color BrightSpec Synthesizer Module
Digitizer	125 MS/s 14-bit Digitizer with FPGA Signal Averaging
Repetition Rate	Adjustable, 0-98% duty cycle
Number of Signal Averages	Up to 4 million
Synchronization to External Devices	4 CMOS-compatible (3.3 V) configurable marker channels provided
Sampling Options	
BrightSpec Standard Sample Cell	65 cm pathlength transmission cell w/turbomolecular pump Compatible with user provided sample cells: static gas, pulsed and CW jet, Balle-Flygare cavity, waveguide, and more
Sampling Module Options	BrightSpec Air/Gas/Headspace Flow BrightSpec Headspace Module (with optional autosampler)
Measurement Modes	Broadband Scan (Segmented Chirped Pulse method) Targeted Nutation Double Resonance Custom Pulse Sequences
Typical Linewidth (FWHM)	
Typical Sensitivity (60 s targeted detection, direct in N ₂ , with BrightSpec Standard Sample Cell)	
Water	1 ppm
Ammonia	1 ppm
Carbonyl Sulfide	8 ppm
Ethylene Oxide	12 ppm
Sulfur Dioxide	20 ppm
Operating Temperature	25 +/- 10°C
Humidity Range	20-80% R.H.
Noise	<70 dB(A)
Shipping Weight	146 lbs/66 kg
Power	100-240 VAC, 50/60 Hz, single-phase Typical <300 W; peak 750 W

