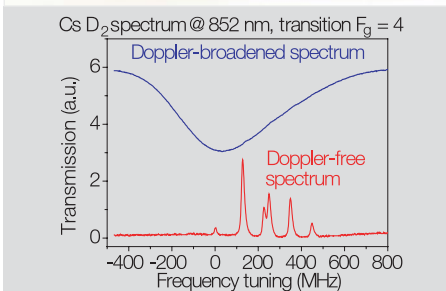


CoSy

Compact Saturation Spectroscopy Unit



CoSy, measurement head and control unit.

Doppler-free and Doppler-broadened absorption spectrum of Cesium. All hyperfine and cross-over lines are resolved.

Key features

- Compact unit for Doppler-free absorption spectroscopy
- Cs or Rb filling, others on request
- Fiber input
- Magnetic field for Zeeman shift of atomic lines

Doppler-free saturation spectroscopy

Saturation spectroscopy is a well-established technique for precise frequency stabilization of tunable lasers. The usage of two counter-propagating laser beams within the same absorption volume serves to select a class of atoms with zero velocity in the direction of beam propagation. Hence, Doppler broadening of atomic absorption lines is suppressed, greatly increasing the resolution of the acquired absorption spectra.

Ideal for laser locking

The CoSy module comprises all optical components and signal processing electronics needed for Doppler-free spectroscopy in a compact, fiber-coupled unit. The laser can thus be stabilized to

any absorption signature, using either the regulator modules of the SYS DC 110 series (see pages 30 - 38), or the stand-alone lock-box LaseLock (see pages 40 - 41). Frequency stabilities below 1 MHz are easily attained, corresponding to a relative uncertainty on the 10⁻⁹ level.

CoSy components

The CoSy measurement head contains the spectroscopy cell, optics and photodetectors. The absorption cell is thermally stabilized in order to provide a constant vapor pressure. The CoSy Control unit includes the power supply module, the signal processing board, the temperature controller, and output signal connectors. Both Doppler-broadened and Doppler-free spectra are simultaneously available.

Specifications

Dimensions of glass cell	ø 26 mm x 25 mm or ø 26 mm x 15 mm
Available fillings	(COSY-RB) Rubidium; mixture of ⁸⁵ Rb and ⁸⁷ Rb (COSY-CS) ¹³³ Cs (COSY-XX) Other cells on request (see next page)
Fiber input power	1 μW ... 3 mW, depends on required resolution and SNR
Gain of photo detector amplifiers	Adjustable via range switch (coarse) and trim potentiometer (fine)
Set temperature of glass cell	Adjustable via trim potentiometer, range 10 to 40 °C (no cooling below room temperature)
Electronic outputs (BNC sockets)	A: Doppler-free absorption spectrum B: Doppler-broadened absorption spectrum I: Optical input power level
Integrated field coil	AC or DC magnetic field for Zeeman spectroscopy, magnetic flux density: range ± 70 μT
Housing dimensions	CoSy head 80 x 80 x 114 mm ³ CoSy control 88 x 125 x 209 mm ³
Operating voltage for CoSy control	100...120 V / 220 .. 240 V AC, 50 .. 60 Hz (auto detect)