

LEAI-21A Zeeman Effect Apparatus with Electromagnet

- *Transverse & longitudinal Zeeman effects*
- *Variable magnetic field from electromagnet*
- *High accuracy Teslameter*
- *Large magnet pole for uniform interference pattern*
- *Wideband etalon allowing observation of Zeeman effects at multiple Hg wavelengths*
- *Optional CCD camera with analysis software*



This Zeeman effect experimental apparatus uses an electromagnet to split the spectral line of Mercury at 546.1 nm to generate π and σ lines. A direct reading microscope is used to measure the interference pattern from a F-P etalon. The axial hole on one magnet pole allows the Mercury light to propagate in the longitudinal direction, so both transverse and longitudinal Zeeman effects can be observed by using this apparatus. An optional CCD with analytical software can be used to acquire and analyze the interference pattern to calculate the Bohr magneton. In addition, the wideband etalon allows the observation of Zeeman effect at other Mercury spectral lines of 577 nm, 436 nm and 404 nm with an optional set of filters.

The instruction manual contains comprehensive materials including experimental configurations, principles and step-by-step instructions. Using this instrument, the following experiments can be conducted:

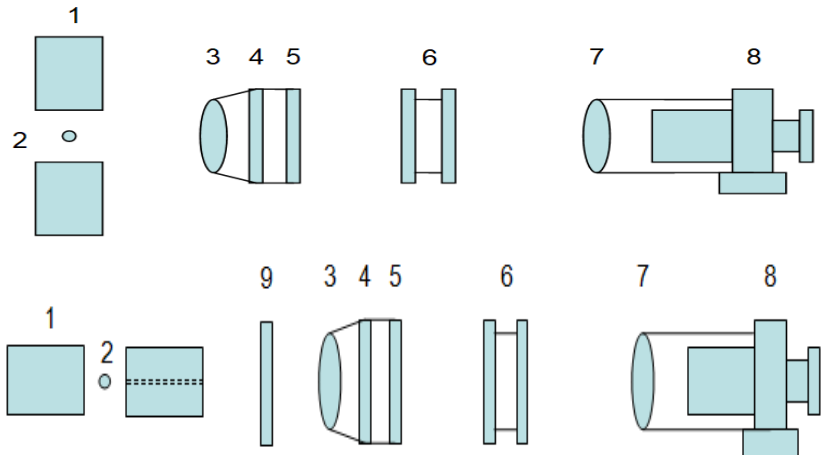
1. Understand atomic magnetic moment and spatial quantization in atomic physics
2. Observe transverse and longitudinal Zeeman effects of Mercury at 546.1 nm
3. Observe the splitting and the polarization of a Mercury spectral line at 546.1 nm
4. Determine the electron charge-mass ratio (e/m) based on Zeeman splitting amount.

Specifications

Electromagnet	intensity: >1000 mT; pole: spacing 8 mm, dia 30 mm; axial aperture: 5 mm
Power supply of electromagnet	5 A/30 V (max)
Etalon	solid gap, material optical quartz, refractive index 1.46 @ 546.1 nm, aperture 26 mm, thickness 1.4 mm; passband: >100 nm; R= 95%; flatness:< $\lambda/30$
Teslameter	range 0-1999 mT; resolution 1 mT
Pencil mercury lamp	emitter diameter 6.5 mm; starting voltage 1500 V, power 3 W
Interference optical filter	CWL 546.1 nm; half passband 8 nm; aperture 19 mm
Direct reading microscope	magnification: 20 X; range 6 mm; resolution 0.01 mm
Polarizer	aperture 20 mm, rotation 0 - 360°, resolution 1°
Lenses	2 pieces, dia 34 mm
Optical rail	length 500 mm, scale division 1 mm

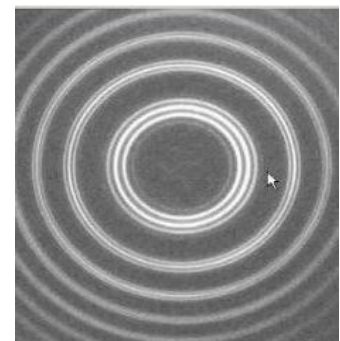
Part List

Main Electric Unit	1
Pencil Mercury Lamp	1
Milli-Teslameter Probe	1
Optical Rail	1
Carrier Slide	4
Power Supply of Electromagnet	1
Electromagnet	1
Polarizer	1
Interference Filter	1
F-P Etalon	1
1/4 Wave Plate	1
Lens	2
Direct Reading Microscope	1
Power Cord	1
Instruction Manual	1
CCD, USB Interface & Software (optional)	1 set



1. Electromagnet, 2. Mercury lamp, 3. Condensing Lens, 4. Filter 5. Polarizer, 6. F-P etalon, 7. Imaging Lens, 8. Microscope (or CCD), 9. 1/4 wave plate

Schematic of experimental setup (transverse and longitudinal)



Note: above product information is subject to change without notice.