

Atomic spectra of two-electron systems: He, Hg 5.1.08-00



- What you can learn about ...
- Parahelium
 - Orthohelium
 - Exchange energy
 - Spin
 - Angular momentum
 - Spinorbit interaction
 - Singlet and triplet series
 - Multiplicity
 - Rydberg series
 - Selection rules
 - Forbidden transition
 - Metastable state
 - Energy level
 - Excitation energy

Principle:

The spectral lines of He and Hg are examined by means of a diffraction grating. The wavelengths of the lines are determined from the geometrical arrangement and the diffraction grating constants.

What you need:

| | | |
|--|----------|---|
| Spectral tube, Hg | 06664.00 | 1 |
| Spectral tube, He | 06668.00 | 1 |
| Holders for spectral tubes, 1 pair | 06674.00 | 1 |
| Cover tube for spectral tubes | 06675.00 | 1 |
| Connecting cable, 30 kV, l = 1000 mm | 07367.00 | 2 |
| Object holder 50 mm x 50 mm | 08041.00 | 1 |
| Diffraction grating, 600 lines/mm | 08546.00 | 1 |
| High voltage supply 0...10 kV | 13670.93 | 1 |
| Insulating support | 06020.00 | 2 |
| Tripod base -PASS- | 02002.55 | 1 |
| Barrel base -PASS- | 02006.55 | 1 |
| Support rod -PASS-, square, l = 400 mm | 02026.55 | 1 |
| Right angle clamp -PASS- | 02040.55 | 3 |
| Stand tube | 02060.00 | 1 |
| Meter Scale, l = 1000 x 27 mm | 03001.00 | 1 |
| Cursor for scale, 2 pieces, plastic, red | 02201.00 | 1 |
| Measuring tape, l = 2 m | 09936.00 | 1 |

| Colour | λ /nm | Transition |
|---------------|---------------|---------------|
| red | 665 ± 2 | $3^1D R 2^1P$ |
| yellow-orange | 586 ± 2 | $3^3D R 2^3P$ |
| green | 501 ± 2 | $3^1D R 2^1P$ |
| blue-green | 490 ± 2 | $4^1D R 2^1P$ |
| blue | 470 ± 3 | $4^3S R 2^3P$ |
| violet | 445 ± 1 | $4^3D R 2^3P$ |

| Colour | λ /nm | Transition |
|--------|---------------|---|
| yellow | 581 ± 1 | $\left\{ \begin{array}{l} 6^1D1 R 6^1P1 \\ 6^3D1 R 6^1P1 \end{array} \right.$ |
| green | 550 ± 1 | $7^3S1 R 6^3P1$ |
| green | 494 ± 2 | $8^1S1 R 6^1P1$ |
| blue | 437 ± 2 | $7^1S R 6^1P1$ |

Measured spectral lines of He/Hg and the corresponding energy-level transitions.

Complete Equipment Set, Manual on CD-ROM included
Atomic spectra of two-electron systems: He, Hg P2510800

Tasks:

1. Determination of the wavelengths of the most intense spectral lines of He.
2. Determination of the wavelengths of the most intense spectral lines of Hg.