



# US/Canada Price List in US Dollars November 2009

(Prices subject to change without notice)

Instruments Designed for Teaching

## Diode Laser Spectroscopy, DLS1-A\*

**Complete Instrument . . . . . \$ 15,695.00**

Includes: Laser Head · 2 Diode Lasers (tested) · Complete Electronics (*Laser Controller, Cell Temperature Controller, Detector Electronics*) · 3 Photodiode Detectors with preamp · IR Viewing Card · CCD Camera · TV Monitor · Optics with all mounts and bases (*5 Mirrors, High Power Neutral Density Filter, 2 Neutral Density Filter sets with holder, 0.5° Optical Wedge, 1° Optical Wedge, 2-50/50 Beam Splitters, Fixed Beam Splitter, 2 Rotating Linear Polarizers, 2 Rotating 1/4-Wave Plates*) · Absorption Cell Assembly (*Rb Cell, Helmholtz Coils, Cell Heater, Rotating Stand*) · 2 Safety Goggles · Special Tools · Black Anodized Aluminum Optical Bread Board 24" x 36" x 1/2" · Instructor/Student Manual

\* **Magnetic field experiments require a separate current controlled power supply.**  
(See recommended accessory.)

**Premium Instrument . . . . . \$ 16,965.00**  
(Includes Fabry-Perot Cavity)

**Complete without Breadboard . . . . . \$ 14,985.00**

**Basic Experiments, DLSB1-A . . . . . \$ 14,455.00**  
This system **does not include** optics needed for simultaneous interferometry or several magnetic field experiments. Items Deleted: 1 Photodiode Detector, 2 Mirrors, 2° Wedge, 1 50/50 Beam Splitter, Fixed Beam Splitter, 2 Rotating Linear Polarizers, 2 Rotating 1/4-Wave Plates

**Diode Laser and Controller, DLHC1-A. . \$ 10,254.00**  
Includes: Laser Head · 2 Diode Lasers (tested) · Complete Electronics (with cell temperature controller and detector electronics) · Manual · 2 pair Mandatory Safety Goggles

**Optical Detector, DLOD1-A . . . . . \$ 342.00**  
Includes: Complete Mounting Hardware · Photodiode with Low-Noise Preamp · Hood

**Absorption Cell Assembly . . . . . \$ 2,494.00**

### **Recommended Accessories:**

Fabry-Perot Cavity FP1-A  
(if purchased within one semester) . . . . . \$ 1,270.00  
Auxiliary Power Supply for Magnetic Experiments  
Texio PR36-3A (36 Volts, 3 Amps) . . . . . \$ 579.00

## Earth's Field NMR, EFNMR1-B\*

**Complete System including Gradient/Field Coil. . . . . \$ 7,130.00**

Includes: Sample and Bucking Coil · Electronics for Sample and Bucking Coil (*Polarization Timer, High-Q Tuned Amplifier, Tuning Controls, Sound Amplification, Built-In Speaker*) · 2 Sample Holders · Gradient/ Field Coil System (*x,y,z Gradient Coils, Helmholtz Field Coils, Controller with Built-In Gradient Coil Power Supply*) · Segmented Sample Holder with filling syringe · Dip Needle Compass · All Connecting Cables · Instructor/Student Manual

**Premium System . . . . . \$ 7,990.00**  
(Includes 2 Texio Power Supplies)

### **Partial Systems Available:**

**Basic Instrument, EFNMR1-A\* . . . . . \$ 4,685.00**  
Includes: Sample and Bucking Coil · Electronics for Sample and Bucking Coil (*Polarization Timer, High-Q Tuned Amplifier, Tuning Controls, Sound Amplification, Built-In Speaker*) · 2 Sample Holders · All Connecting Cables · Instructor/Student Manual

**Basic with Texio Supply . . . . . \$ 5,115.00**

**Earth's Field NMR Gradient/Field Coil System, EFGFC1-A\* . . . . . \$ 2,738.00**  
Includes: x,y,z Gradient Coils, Helmholtz Field Coils, Controller with Built-In Gradient Coil Power Supply · Dip Needle Compass · Segmented Sample Holder with filling syringe · All Connecting Cables · Instructor/Student Manual

**G/F Coil with Texio Supply . . . . . \$3,168.00**

\* **These systems require separate current controlled power supplies such as the Texio PR36-3A**

### **Recommended Accessories:**

NEW Spin Flip Coils . (Introductory Price) 129.00  
Texio PR36-3A Power Supply . . . . . 579.00  
Extra Sample Holders . . . . . 3.20  
Additional Segmented Sample Holder with filling syringe . . . . . 89.00  
Fluorine Liquid Samples: (non-volatile, non-toxic):  
Perfluoropolyether Fluid HT-110. . . . . 38.00  
Perfluoropolyether Fluid HT-70 . . . . . 38.00  
Perfluoropolyether Fluid PFS-2 . . . . . 38.00  
Adjustable Height Non-Magnetic Stand only to use EFNMR1-A independently . . . . . 207.00

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## Fabry-Perot Cavity, FP1-A

**Basic Instrument\*** . . . . . \$ 1,436.00

Includes: Confocal 20 cm Cavity {Free Spectral Range - 375 MHz, Finesse ~ 100, Mirror reflectivity >99%, Center Freq., 780 nm., band width (99% reflectivity) 80 nm}  
· Iris · 2 Support Posts with bases · Manual

**\*FP1-A requires a variable frequency laser**  
(Side bands observable with DLS1-A & RF signal generator)

## Faraday Rotation, FR1-A

**Basic Instrument \*** . . . . . \$ 1,055.00

Includes: Laser Light Source · Solenoid · High Verdet Constant Glass Rod · Optical Detector · Linear Polarizer in Calibrated Rotating Mount · Mounting Base · Instructor/Student Manual

**Premium Instrument \*** . . . . . \$1,395.00

(Includes Power/Audio Amplifier PAA1-A)

3 or more Premium units . . . . . 1,365.00

### Recommended Accessories:

Additional Glass Rod . . . . . 100.00

Liquid Cell . . . . . 142.00

Power/Audio Amplifier . . . . . 355.00

Texio PR36-3A (36 Volts, 3 Amps) . . . . . 579.00

### **\*NOTES – FR1-A requires power supplies**

Laser: Voltage regulated supply, 4 volt, 40 mA, such as PAA1-A. PAA1-A can also provide the Audio Amp function for AC measurement.

Solenoid: Current regulated supply capable of 3-5 A  
AC Measurement needs a Lock-In such as SPL11-A

## Hall Effect Probe, HE1-A

**Complete Instrument** . . . . . \$ 335.00

(5% discount when purchased with MF1-A)

3 or more units . . . . . 323.00

Includes: Probe with axial and radial detectors · Non-magnetic base and support rod · Calibration Kit  
(Helmholtz 4" coil form, support for coil form, 4 spools of wire for student use.)

## Hall Effect Calibration Kit,

**HECK1-A** . . . . . \$ 25.00

Includes: Helmholtz 4" coil form, support for coil form, 4 spools of wire for student use

## Magnetic Force, MF1-A

**Complete Instrument \*** . . . . . \$ 435.00

5 or more units . . . . . 415.00

Includes: Helmholtz Coils · Tower with Cap · Magnetic Dipole in Gimbal · Calibrated Spring · 1 g weights (set of 5) · Instructor/Student Manual

### Replacement Parts:

Tower with Cap . . . . . 49.00

Magnetic Dipole in Gimbal . . . . . 46.00

Brass Rod . . . . . 1.60

Spring . . . . . 8.50

1 g weights (set of 5) . . . . . 1.60

**\*MF1-A requires a 36 volt, 3 A, current regulated power supply such the Texio PR36-A**  
(See stand alone accessories.)

## Magnetic Torque, MT2-B

**Complete Instrument** . . . . . \$ 2,955.00

Including Magnetic Force Balance Kit

3 or more units . . . . . 2,783.00

Includes: Magnet Coils · Air Bearing · Power Supply · Air Pump · Electronics for Strobe Light and Counter · One Magnetic Sphere · Magnetic Force Balance Kit · Rotating Magnetic Field · Gravitational Torque Arms and Sliding Weight · Instructor/Student Manual

### Recommended Accessories:

Magnetic Force Tower Kit . . . . . 106.00

Includes: Dipole in Gimbal, Spring, Weights, Tower with Cap

### Replacement/Additional Parts:

Additional Magnetic Sphere . . . . . 64.00

Replacement Air Pump . . . . . 80.00

Replacement Flash Lamp . . . . . 16.00

Replacement Torque Arm . . . . . 6.00

Sliding weight for Torque Arm . . . . . 7.00

**Without Rotating Magnetic Field, deduct \$ 130.00**

**Without Magnetic Force Balance, deduct \$ 140.00**

## Magnetic Torque Magnetic Balance Kit,

**MTMFB1-A** . . . . . \$ 186.00

Includes: Balance Beam with Knife Edge · Support with Ceramic Bearings · Counter Weight · Small Weights · Reference Marker

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**Modern Interferometry, MI1-A**

**Complete Instrument\* . . . . . \$ 14,314.00**

Includes: Kit contains all elements to configure Michelson, Sagnac or Mach-Zehnder Interferometers and to perform a wide variety of experiments. Proprietary Apparatus: *Translational Stage, High Stability Mirror Mounts (3), Optics for Quadrature Detection, Large Area Photodiode Detectors (2), Solenoid, Pressure Transducer, Light Sources (4), Electronics for Fringe Counting – (optics with bases)* All Parts for Experiments on: *Index of Refraction of Gas, Electro-optic Effect, Magnetostriction, Piezo Electricity, Thermal Expansion, White Light Fringes, and Absolute Spatial Dimension.* · Optical Breadboard with Stabilizers · Student/Instructor Manual

A detailed list of components is posted on the TeachSpin website and is available on request..

**\* Customer must supply power for white light source Magnetostriction experiments require a current regulated 36 volt, 3 A powers supply such the Texio PR36-A (See stand alone accessories.)**

**Complete without Breadboard . . . \$ 13,750.00**

**Optical Detector, MIOD1-A . . . . . \$ 371.00**

Includes: Complete Mounting Hardware · Large Diameter Photodiode with Low-Noise Preamp

**Flexure Mirror Mount, MIMM1-A . . . . . \$ 403.00**

Includes: High-Stability Flexure Mirror Mount · Base · Extra Mirror (Please specify Horizontal or Vertical Hinge)

**Flexure Translation Stage, MITS1-A . . . . \$ 638.00**

Includes: Proprietary Translation Stage · Push rod translation lever · V-block support

**Differential Micrometer . . . . . \$ 454.00**

Includes: micrometer · base · spline

**Magnetostriction Kit, MIMS1-A . . . . \$ 390.00**

Includes: Solenoid · Test Samples (Cu, Fe, Ni)

**Refraction of Gas Kit MIRG1-A . . . . . \$ 1,047.00**

Includes: Optical Gas Cell with post · Gas Handling Manifold with Connective Tubing · Pressure Transducer (requires power supply if not used with MI Controller)

**Piezoelectric Translator . . . . . \$ 109.00**

requires user supplied signal generator

**Dielectric Beam Splitter with base . . . . . \$ 414.00**

**Metallic Beam Splitter with base . . . . . \$ 490.00**

**Muon Physics, MP1-A**

**Complete Instrument\* . . . . . \$ 4,957.00**

Includes: Detector Module containing Scintillator, Photomultiplier, High Voltage Power Supply, LED with Variable Pulser · Electronics · Software with Source Code Instructor/Student Manual

**\*Requires User Supplied Computer**

**Optical Pumping, OP1-B**

**Complete Instrument\* . . . . . \$ 13,650.00**

Includes: High Homogeneity Horizontal and Vertical Magnetic Field Coils on Base · Complete Optical System (*Rubidium Light Source, Absorption Cell, Interference Filter, Linear Polarizer,  $\lambda/4$  Wave Plate, Optical Rail, Optical Detector/Preamplifier, Lenses*) · Cell Heater · Complete Electronic Controller (*RF Amplifier, Detector Amplifier, Horizontal Magnetic Field Sweep, Vertical Field, Temperature Controller, Internal Power Supply*) · Instructor/Student Manual

**Recommended Accessories:**

Non-Magnetic Table for Coils. . . . .	196.00
RF Signal Generator, (100 kHz – 450 MHz) . .	239.00
Auxiliary High Current Power Supply,	
Texio PR36-3A (36 Volts, 3 Amps) . . . . .	579.00
Circuit Diagrams . . . . .	75.00

**Rubidium Lamp . . . . . \$ 2,650.00**

Available Independently, See Individual Components  
REQUIRES Power Supply Capable of 28 V/0.5 A

**\*NOTES:**

- 1. For basic operation, OP1-B requires an RF Signal Generator, 100 kHz – 20 MHz.**
- 2. High Magnetic Field Experiments require an additional power supply  $\geq$  36 V, 3 A. (See Recommended Accessories)**

**Power/Audio Amplifier, PAA1-A**

**Complete Instrument . . . . . \$ 355.00**

Includes: Electronics described below, Universal “Brick-on-a-rope” Power supply, Instruction Manual

**Specifications**

Freq. Range: DC-20 kHz  
Gain: Variable  
Max Outputs: 1.0 A (Peak), 10 Volt (Peak to Peak)  
Laser Power Supply: 4.1V@ 0.1A

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### Pulsed NMR Spectrometer, PS2-A

**Complete Instrument . . . . . \$ 16,750.00**

Includes: Magnet with Sample Head, Gradient Coils and Temperature Stabilizer · Mainframe Electronics (*Power Supply, Receiver, Pulse Programmer, 21 MHz OSC/AMP/Mixer. Lock-In Amplifier*) · Gradient Coil/Temperature Controller, 7 BNC Cables · AC Power Cord · Sample Case with 50 Vials and Caps · Instructor/Student Manual

#### **PNMR Without Magnet - Inquire**

##### **Recommended Accessories:**

Circuit Diagrams . . . . . 75.00

##### **Replacement Parts:**

50 Vials with Caps . . . . . 65.00

### Quantum Analogs QA1--A

**Complete Instrument\* . . . . . \$ 4,435.00**

Includes: Atom-Molecule Models (4 Aluminum Hemispheres - *one with built-in speaker and microphone, one with built-in microphone*) · Band Gap Model (*base, speaker, microphone, 2 sets of cylinders, 3 sets of iris*) Complete Electronics (*AC low noise Amplifier, Amplitude Detector, Frequency to voltage converter*) · Instructor/Student Manual

##### **Recommended Accessory:**

Function Generator . . . . . **Inquire**

\* **QA1-A requires a Sine wave generator capable of producing 1-50 kHz with a peak-to-peak voltage of 0.50 V such as the Protek B8003FD.**

### Signal Processor/Lock-In Amplifier, SPLIA1-A

**Complete Instrument . . . . . \$ 2,490.00**

Includes: Preamplifier · Filter · Low-Pass Amplifier · Oscillator · Phase Shifter · Noise Generator · Attenuator · Amplitude and Lock-In Detector · Seven Short BNC Cables · Instructor/Student Manual

##### **Recommended Accessory:**

Power/Audio Amplifier PAA1-A . . . . . \$ 355.00

### Sonoluminescence, SL100-B

**Basic Instrument\* . . . . . \$ 5,276.00**

Includes: Control Unit Electronics · Horn · TNC Horn Cable · Mounted Rectangular Cell with Ring Stand · Heater with Cable · Hydrophone Probe · AC Power Cord · Instruction Manual

##### **Recommended Accessories:**

Ramsey SG-560 Frequency Synthesizer . . . . . 422.00

Photomultiplier (PMT) . . . . . 714.00

Peltier Cooler Module with

Cylindrical Cell . . . . . 1,733.00

Additional Cell (Cylindrical) . . . . . 525.00

\* **SL100-B requires a Frequency Synthesizer. (See Recommended Accessories.)**

### Torsional Oscillator TO1-A

**Complete Instrument\* . . . . . \$ 2,485.00**

Includes: INQUIRE

6 or more units . . . . . 2,385.00

\* **Driven oscillation experiments require a function or signal generator capable of 0.1 – 10 Hz. For high Q measurements, a frequency resolution of 0.01 Hz will be needed such as Protek B8003FD.**

### Two-Slit Interference, One Photon at a Time, TWS1-B

**Complete Instrument\* . . . . . \$ 5,975.00**

Includes: U Channel with Optics · Power Supply · Cables · Detachable Detector System including Photodiode and Photomultiplier · Instructor/Student Manual

3 or more units . . . . . 5,929.00

##### **Replacement/Additional Parts:**

Replacement Slits . . . . . 69.00

##### **Recommended Accessories:**

Cricket, CR1-A . . . . . 91.00

B+K 200 MHz Universal Counter . . . . . 284.00

\* **TWS1-B requires an electronic counter with a frequency range of at least 0 – 1 MHz such as the B+K unit above.**

### Two-Slit's Cricket, CR1-A

**Complete Instrument . . . . . \$ 91.00**

Includes: Electronics (convert individual 400 ns TTL output pulses from a photomultiplier to 5 ms internal pulses) · Piezoelectric Buzzer · Amplifier

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### Stand Alone Accessories

#### Power Supply

**Texio PR36-3A** . . . . . \$ 579.00  
(Formerly known as Kenwood)

#### Ramsey SG560 Frequency Synthesizer

**0 – 5 MHz** . . . . . \$ 422.00

#### RF Signal Generator

**100 kHz – 450 MHz** . . . . . \$ 239.00

#### B+K Universal Counter

**200 MHz** . . . . . \$ 284.00

### Individual Components

**Breadboard** . . . . . \$ 916.00

Black Anodized Aluminum 24" x 36" x 1/2"

**Breadboard with stiffening ribs** . . . \$ 970.00

**Rubidium Lamp** . . . . . \$ 2,650.00

Includes: Rb 9 mm diameter bulb, 75 – 90 MHz RF oscillator, 120 °C temperature regulated oven, Natural isotopic concentration with 3 Torr Xenon buffer  
REQUIRES Power Supply Capable of 28 V/0.5 A

**Interference Filter** . . . . . \$ 432.00

Includes: mounted 2" diameter filter, Transmission at 795 nm > 75%, 780 nm < 5%

#### Photodiode Photodetectors

Spectral Range: 400 – 1000 nm, Variable Gain  
Power Supply Required: ± 12 V

Includes: Complete Mounting Hardware · Large Diameter Photodiode with Low-Noise

**Small Area (31 mm<sup>2</sup>)** . . . . . \$ 342.00  
(Used in DLS & OP)

**Large Area (100 mm<sup>2</sup>)** . . . . . \$ 371.00  
(Used in Modern Interferometry)

#### High-Stability Flexure Mirror Mount

**with Base and extra mirror** . . . . . \$ 403.00  
Please Specify Horizontal or Vertical Hinge.

**Flexure Translation Stage, MITS1-A** . . . \$ 638.00

Includes: Proprietary Translation Stage · Push rod translation lever · V-block support

**Differential Micrometer** . . . . . \$ 454.00

Includes: micrometer · base · spline

**Magnetostriction Kit, MIMS1-A** . . . . \$ 390.00

Includes: Solenoid · Test Samples (Cu, Fe, Ni)

**Refraction of Gas Kit MIRG1-A** . . . . \$ 1,047.00

(with Differential Pressure Transducer)

Includes: Optical Gas Cell with post · Gas Handling Manifold with Connective Tubing · Pressure Transducer (requires power supply if not used with MI Controller)

**Differential Pressure Transducer** . . . \$ 363.00

Max. Δ Pressure = ± 1 atm, Output: ± 10 V = ± 1 atm

**Piezoelectric Translator** . . . . . \$ 109.00

user supplies signal generator

**Dielectric Beam Splitter with base** . . . \$ 414.00

**Metallic Beam Splitter with base** . . . . \$ 490.00

### Also Available

**Training at TeachSpin Factory for TeachSpin customers** . . . . . \$ 500.00

Includes: Full day of on-site training at a mutually convenient time

**“Security” Labels** . . . . . FREE

Includes: Set of 8 embarrassment labels – Funding provided by TF-SOS, “TeachSpin Foundation for a Secure and Operating Student Laboratory”