



Instruments Designed for Teaching

# International Price List in US Dollars January 2018

(Prices subject to change without notice)

## Condensed Matter Physics, CMP1-A

*TeachSpin's Condensed-Matter Physics initiative is a modular package, built of parts that can be purchased separately. Users, for example, might provide their own Vacuum (pumping) System. Users will likely start with the Variable Temperature Cryostat System and the Cryostat Support Electronics listed below. The (three) experiments also listed below are built to mount in the TeachSpin Cryostat, but they can be purchased in any order or combination.*

**Variable Temperature Cryostat System..... \$16,760.00**

Includes: Completely Wired 80-400K Dewar, Thermocouple Gauge with Two Sensors, Vacuum Valves, Sample Chambers, Heaters and Diode Thermometers, Interface Connector Box, D-sub cables (3), Custom Wooden Dewar Support, Manual

**Cryostat Support Electronics..... \$6,585.00**

Includes: SRS "Mainframe" SIM 900, SRS Diode Temperature Monitor SIM 922, TeachSpin's PI Temperature Controller PITC1-A, (3) Mounted Diode Thermometers, TeachSpin's Dual Current Supply, 2 Volteq HY6003D Power Supply, 4-3Ft. Banana-Jack Cables, Manual

**Transport/ Electrical Experiments..... \$2,195.00**

Includes: TeachSpin's Constant Current Source CCS1-A, Sample Platform 6-Wire Connector, Two Mounted Semiconductor Samples n-, p- type Si, Circuit Board Platform, 3 Evaporation Substrates, Manual  
Recommended Accessory: Fluke 287 Multimeter..... \$545.00

**Magnetic Susceptibility Experiments..... \$3,550.00**

Includes: Hartshorn-Coil Assembly, TeachSpin's Hartshorn Coil Driver HCD1-A, Various Sample Holders, Probe Coil, Temperature Probe, Sample Molds and Epoxy Kit, 12 Special Samples, Manual  
NOTE: Measurement Requires Lock-In Amplifier, such as

TeachSpin's SPLIA1-A..... \$3,075.00

**Specific Heat Experiments..... \$3,825.00**

Includes: TeachSpin's Pulsed Current Source PC1-A, High Gain Utility Amplifier, Complete Addendum and Hardware, Sample Molds and Epoxy Kit, 14 Special Samples, Manual

**Vacuum System..... \$8,729.00**

Includes: Pfeiffer HiCube 80 Turbo Pump, Complete Valve, Lines, Cross, O-Rings, Clamps, Etc., Pirani/Cold Cathode Vacuum Gauge, Custom Wood Stand, Instructions for Operation

**TeachSpin's Dual Current Supply for Diode Thermometry DCCDT1-A..... \$875.00**

**Power Supply for Two SIM Modules, TeachSpin CMPPS1-A..... \$325.00**

**Room Temperature Hall Effect Experiments..... \$1,788.00**

Includes: p-type & n-type Silicon Samples, and Copper Sample

Recommended Accessory: Additional Silicon Sample..... \$435.00  
Evaporation Substrates..... 1-9 \$22 each, \$160 for 10  
Additional Semiconductor Samples..... Inquire  
Fluke 287 Multimeter..... \$545.00

**Foundational Magnetic Susceptibility..... \$1,798.00**

Includes: Microbalance, Sample Manipulator, Material Samples (16), Sample Containers (24), Suspended Magnet, Current-Loop Calibrator, Graphite Levitation Kit, Manual

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### Diode Laser Spectroscopy, DLS1-A\*

**Complete Instrument\*** . . . . . **\$ 19,305.00**  
Includes: Laser Head · 1 Extra 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,  
 1° Optical Beam Splitter, 2° Optical Beam Splitter,  
 2-50/50 Beam Splitter, Flat Beam Splitter, 2 Rotating  
 Linear Polarizers, 2 Rotating ¼-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 ½" ·  
 Instructor/Student Manual

\* **Magnetic field experiments require a separate current  
 controlled power supply.**

**Enhanced Instrument** . . . . . **\$ 21,175.00**  
 (Includes Fabry-Perot Cavity)

**Recommended Accessories:**  
 Fabry-Perot Cavity FP1-A . . . . . \$ 1,865.00

### **DLS Partial Systems Available:**

**Any System without Bread Board, deduct \$ 621.00**

**Basic Experiments, DLSB1-A** . . . . . **\$ 17,903.00**  
 This system **does not include** optics needed for  
 simultaneous interferometry or several magnetic field  
 experiments. Items Deleted: 1 Photodiode Detector  
 (Center), 2 Mirrors, 2° Beam Splitter, 1 50/50 Beam  
 Splitter, Flat Beam Splitter, 2 Rotating Linear Polarizers, 2  
 Rotating ¼-Wave Plates

Note: This system does not includes Bread board

**Diode Laser and Controller, DLHC1-A** **\$ 13,393.00**  
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** . . . . . **\$ 479.00**  
Includes: Complete Mounting Hardware · Photodiode with  
 Low-Noise Preamp · Hood

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

**Complete System including  
 Gradient/Field Coil\*** . . . . . **\$ 8,795.00**

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 · Set of 3 Fluorine Samples (non-  
 volatile, non-toxic) · Dip Needle Compass · All Connecting  
 Cables · Instructor/Student Manual

\* **2 Separate current controlled power supplies required.  
 Polarizing 60V 3 A – Volteq; Gradient/Field - Inquire**

**Premium System** . . . . . **\$ 9,675.00**  
 (Includes Hall Effect Probe)

**Recommended Accessories/Additional Parts:**  
 Spin Flip Coils . . . . . 270.00  
 Additional Set Fluorine Liquid Samples . . . 198.00  
 non-volatile, non-toxic perfluoropolyether  
 fluids ( HT-110, HT-70, PFS-2)  
 Extra Sample Holders . . . . . 6.35  
 Additional Segmented Sample Holder with  
 filling syringe . . . . . 150.00  
 Hall Effect Probe (if purchased with EF) . . . . . 429.00

### **EFNMR Partial Systems Available:**

**Basic Instrument, EFNMR1-Ai.** . . . . . **\$ 5,748.00**  
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

**Earth's Field NMR Gradient/Field Coil  
 System, EFGFC1-Ai.\*** . . . . . **\$ 3,955.00**

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

\***Power Supply Needed - Inquire**  
 With Hall Effect Probe . . . . . \$4,593.00



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### Fabry-Perot Cavity, FP1-A\*

**Basic Instrument\*** . . . . . \$ 1,975.00

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 \*** . . . . . \$ 1,375.00

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

**Enhanced Instrument \*** . . . . . \$1,755.00

(Includes Power/Audio Amplifier PAA1-A)  
3 or more Enhanced units . . . . . 1,710.00

#### Replacement/Additional Parts and Accessories:

Additional Glass Rod . . . . . 164.00  
Liquid Cell (Pair) . . . . . 325.00  
Power/Audio Amplifier . . . . . 479.00  
Hall Effect Probe (if purchased with FR) . . . 429.00  
Signal Processor/Lock-In. (SPLI-A) . . . . . 3,075.00  
(SPLI-A needed for AC Measurements)

**\*NOTES – FR1-A requires power supplies**  
Solenoid: Current regulated supply capable of 3-6 A  
Laser: Voltage regulated supply, 4 volt, 40 mA, such as PAA1-A. PAA1-A can also provide the Audio Amp function for AC measurement.  
AC Measurement needs a Lock-In such as SPLI1-A

### Foundational Magnetic Susceptibility

**Complete Instrument.** . . . . . \$ 1,798.00

Includes: Microbalance, Sample Manipulator, Material Samples (16), Sample Containers (24), Suspended Magnet, Current-Loop Calibrator, Graphite Levitation Kit, Manual

### Fourier Methods, FM1-A\*

**Complete Instrument \*** . . . . . \$ 10,038.00

Includes: Stanford Research Systems SR770 Spectrum Analyzer (w/USB Port) · Electronic Modules (Analog Summer, Analog Multiplier, Audio Mixer, Radio-Frequency Mixer; Analog High-Low-Bandpass Filter, Wide-Band Amp, Power Audio Amp, Speaker; Voltage-Controlled Oscillator for FM Generation, DC Voltage Supply; Lorenz Analog Chaos, LCR Resonance, 'Buried Treasure' for Signal-Under-Noise, Intermodulation Distortion) · Accessories for Audio (3.5 mm/BNC) Interconnections · External Experiments (Fluxgate Magnetometer · Acoustic Resonator · Coupled Oscillator) · Accessories (Microphone · AM Antenna · Universal Power Supply · Cables/Connectors) · Instruction Manual

**TeachSpin Physics Package . . . . \$ 4,945.00**

Includes: Electronic Modules · External Experiments\*\* · Instruction Manual

**\* FM1-A Requires Low End Digital Oscilloscope, a DC Power Supply and a Function Generator**

### Hall Effect Probe, HE1-A

**Complete Instrument . . . . . \$ 468.00**

3 or more units . . . . . 450.00

Includes: Probe with axial and radial detectors · Non-magnetic base and support rod · HECK1-A Calibration Kit (Helmholtz 4" coil form, support for coil form, 4 spools of wire for student use.)

### Magnetic Force, MF1-A\*

**Complete Instrument \*** . . . . . \$ 534.00

5 or more units . . . . . 525.00

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

#### Replacement Parts:

Hall Effect Probe (if purchased with MF) . . . 429.00  
Tower with Cap . . . . . 61.00  
Magnetic Dipole in Gimbal . . . . . 96.00  
Brass Rod & Spring . . . . . 24.00  
Spring . . . . . 16.00  
1 g weights (set of 5) . . . . . 5.00

**\*MF1-A requires a 36 volt, 3 A, current regulated power supply such as the Volteq HY6003D**

### Magnetic Torque, MT2-A

**Complete Instrument . . . . . \$ 3,625.00**

Including Magnetic Force Balance Kit

3 or more units . . . . . 3,515.00

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 . . . . . 187.00  
Includes: Tower with Cap, Dipole in Gimbal, Spring on brass rod, Weights,  
Hall Effect Probe (if purchased with MT) . . . 429.00

#### Replacement/Additional Parts:

Additional Magnetic Sphere . . . . . 94.00  
Replacement Air Pump . . . . . 171.00  
Replacement Torque Arm . . . . . 18.00  
Sliding weight for Torque Arm . . . . . 21.00  
Magnetic Force Balance, for MT1-A . . . . . 315.00  
Replacement Flash Lamp . . . . . 18.00

**Without Rotating Magnetic Field, deduct \$ 154.00**

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### Modern Interferometry, MI1-B\*

**Complete Instrument\* . . . . . \$ 18,645.00**

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

**\* Customer must supply power for white light source  
Magnetostriction experiments require a current regulated  
36 volt, 3 A powers supply**

**Complete without Breadboard . . . \$ 18,024.00**

**Optical Detector, MIOD1-A . . . . . \$ 512.00**

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

**Flexure Mirror Mount, MIMM1-A . . . . . \$ 545.00**

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

\*Prices for Individual Components available upon request

### Muon Physics, MP1-A\*

**Complete Instrument\* . . . . . \$ 5,495.00**

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**

### Noise Fundamentals, NF1-A\*

**Complete Instrument \* . . . . . \$9,103.00**

Includes: High-Level Electronics Controller, Low-Level Electronics Controller, Temperature Module w/ Probe, Break-out Box, Clear Dewar in Adjustable Height Support, Coax Cables, 45 Watt +/-15 Volt Power Supply, Hook Up Wire, Resistors, Transistors, Diodes, Photodiode in Holder, Light Bulbs and LEDs, Spare Operational Amplifiers, Instructor/Student Manual

**\*(Requires User supplied Low End Digital Oscilloscope, a Good digital voltmeter and a Function Generator such as the Rigol Fuction Generator)**

### Optical Pumping, OP1-E\*

**Complete Instrument\* . . . . . \$ 16,363.00**

Includes: Rubidium Lamp · High Homogeneity Horizontal and Vertical Magnetic Field Coils on Base · Complete Optical System (*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:**

Circuit Diagrams . . . . . 110.00

**Rubidium Lamp . . . . . \$ 3,795.00**

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

#### **\*NOTES:**

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

### Power/Audio Amplifier, PAA1-A

**Complete Instrument . . . . . \$ 479.00**

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

### Pulsed/CW NMR Spectrometer, PS2-C

**Complete Instrument . . . . . \$ 19,970.00**

Includes: New 1-D Imaging Capability and Layered Sample Kit, Magnet with Sample Head · Complete Electronics (*Power Supply, Receiver, Pulse Programmer, 15 MHz OSC/AMP/Mixer*) · 7 BNC Cables · AC Power Cord · Sample Case with 50 Vials and Caps · Instructor/Student Manual

#### **Recommended Accessories:**

Circuit Diagrams . . . . . 135.00

#### **Replacement Parts:**

50 Vials with Caps . . . . . 83.00

**PNMR Without Magnet – Inquire**



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### Quantum Analogs, QA1-A\*

**Complete Instrument\* . . . . . \$ 4,945.00**

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

User Computer with Sound Card . . . . . **Inquire**

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

### Room Temperature Hall Effect

#### Experiments

**Complete Instrument\* . . . . . \$1,788.00**

Includes: p-type & n-type Silicon Samples, Copper Sample

Replacement/Additional Parts:

Silicon Sample.....\$435.00  
Evaporation Substrates.....1-9 \$22 each  
\$160 for 10

Additional Semiconductor Samples..... Inquire

Fluke 287 Multimeter..... \$545.00

### SPAD- Single Photon Avalanche Diode

**Complete Instrument. . . . . \$435**

Includes: INQUIRE

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

**Complete Instrument . . . . . \$ 3,075.00**

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 . . . . . \$ 479.00

Circuit Diagrams . . . . . 110.00

### Torsional Oscillator, TO1-A\*

**Complete Instrument\* . . . . . \$ 4,318.00**

Includes: INQUIRE

6 or more units . . . . . 4,208.00

\* 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.

### NEW Torsional Oscillator Auxiliary

#### Electronics AE1-A\*

**Complete Instrument\* . . . . . \$ 875.00**

Includes: INQUIRE

### Two-Slit Interference,

#### One Photon at a Time, TWS2-A

**Complete Instrument . . . . . \$ 7,618.00**

Includes: U Channel with Optics · Power Supply · Cables · Detachable Detector System including Photodiode and hotomultiplier · Cricket · Pulse Counter/Interval Timer · Instructor/Student Manual

Replacement/Additional Parts:

Replacement Slits . . . . . 165.00

### Stand Alone Accessories

#### Pulsed Counter/Interval Timer

PCIT1-A . . . . . **\$864.00**

### Individual Components

**Breadboard with stiffening ribs . . . \$ 1,205.00**

(Required for MII-A Kit)

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

**Breadboard Only . . . . . \$ 1,40.00**

**Rubidium Lamp . . . . . \$ 3,823.00**

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

### 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>) For DLS/OP . . \$ 479.00**

**Large Area (100 mm<sup>2</sup>) For MI. . . \$ 512.00**

### High-Stability Flexure Mirror Mount

**with Base and extra mirror . . . . . \$ 545.00**

Please Specify Horizontal or Vertical Hinge.

### UltraSonic Echoscope/

**GAMPT Scan. . . . . \$ 5,179.00**

**Ultrasonic Probe (1, 2, or 4 MHz) . . . . \$ 711.00**

**Training at TeachSpin . . . . . \$ 550.00**

Includes: Full day of on-site training