Notice Inviting Quotation for Procurement of Lock-in-Amplifier for the
Department of Physics, West Bengal State University.

The University intends to invite rates through sealed quotations for procurement of the following items for the Department of Physics, WBSU from interested agencies or parties or suppliers or distributors or manufacturers. Details of Items/Specifications:

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Name of the Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stanford Research Systems : Model SR830 DSP Dual Phase Lock-In Amplifiers (with rack mount)</td>
<td>01 No.</td>
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Note: - Details Specification is provided in the next page.

The interested agencies or parties or suppliers or distributors or manufacturers of the items in the list, are requested to quote their rates to The Registrar (Officiating), West Bengal State University, Berunanpukuria, Malikapur, Barasat, 24 Pgs (N), Kolkata-700126, for supply of the above listed items along with the following documents: a) Copy of Trade License, b) Copy of GST Registration, c) Pan Card, d) Copy of income tax filed in the last financial year, e) Clearance of professional tax. The rates should be all inclusive GST, Duties, Transportation Charges etc. and the warranty of items to be specified. Incomplete, conditional quotations, those received without proper supporting documents and after due date and time will be summarily rejected. The above quote should indicate firmly the type of tax to be charged.

The quotations along with necessary supporting documents in sealed cover super scribed “QUOTATION FOR PROCUREMENT OF LOCK-IN-AMPLIFIER FOR THE DEPARTMENT OF PHYSICS, WEST BENGAL STATE UNIVERSITY” are to be submitted on or before 05.04.2018 up to 3 p.m. positively and will be opened on 06.04.2018 at 2 p.m. in the Dept. of Physics, WBSU. The University reserves the right for cancelling any or all quotations without showing any reasons thereof. The quoted rates should be valid for three months from the date or opening of the quotation and the items are to be delivered to the University campus at Barasat. However the University reserves right to terminate the notice inviting quotations for the above items at any point of time without assigning any reasons thereof.

Copy for information and necessary action to:

1) The V.C.’s secretariat, WBSU
2) All members of the purchase and tender committee.
3) The HOD, Dept. of Physics, WBSU
4) Dr. Subhajit Sarkar, Dept. of Physics, WBSU
5) The Registrar’s Guard File, WBSU

Registrar (Officiating),
West Bengal State University

Registrar (Officiating),
West Bengal State University Barasat, Kolkata-700126

Registrar (Officiating),
West Bengal State University Barasat, Kolkata-700126
Department of Physics  
West Bengal State University

**Item**: Model SR830 DSP Dual Phase Lock-In Amplifiers (with rack mount) with following specifications,

**Manufacturer**: M/s. Stanford Research Systems, 1290-D, Reamwood Avenue, Sunnyvale, CA 94089, USA

**Equivalent Quantity**: 1 no.

### Specifications

#### Signal Channel

- **Voltage inputs**: Single-ended or differential
- **Sensitivity**: 2 nV to 1 V
- **Current input**: 10⁻⁶ or 10⁻⁸ V/A
- **Input impedance**
  - **Voltage input**: 10 MΩ + 25 pF, AC or DC coupled
  - **Current input**: 1 kΩ to virtual ground
- **Gain accuracy**: ±1% (±0.2% typ.)
- **Noise**
  - 6 nV/√Hz at 1 kHz
  - 0.13 pA/√Hz at 1 kHz (10⁻⁶ V/A)
  - 0.013 pA/√Hz at 100 kHz (10⁻⁷ V/A)
- **Line filters**: 50/60 Hz and 100/120 Hz (Q=4)
- **CMRR**: 100 dB at 10 kHz, decreasing by 6 dB/oct above 10 kHz
- **Dynamic reserve**: >100 dB (without prefilters)
- **Stability**: <5 ppm/°C

#### Reference Channel

- **Frequency range**: 0.001 Hz to 102.4 kHz
- **Reference input**: TTL or sine (400 mVpp min.)
- **Input impedance**: 1 MΩ, 25 pF
- **Phase resolution**: 0.01° front panel, 0.008° through computer interfaces
- **Absolute phase error**: <1°
- **Relative phase error**: <0.001°
- **Orthogonality**: 90° ± 0.001°
- **Phase noise**
  - **Int. reference**: Synthesized, <0.0001° rms at 1 kHz
  - **Ext. reference**: 0.005° rms at 1 kHz, 100 ms, 12 dB/oct
- **Phase drift**: <0.01°/°C below 10 kHz, <0.1°/°C, 10 kHz to 100 kHz
- **Harmonic detection**: 2F, 3F, ..., nF to 102 kHz (n < 19,999)
- **Acquisition time**: (2 cycles + 5 ms) or 40 ms, whichever is greater

#### Demodulator

- **Stability**: Digital outputs and display: no drift. Analog outputs: <5 ppm/°C for all dynamic reserve settings.
- **Harmonic rejection**: -90 dB
- **Time constants**: 10 μs to 30 ks (6, 12, 18, 24 dB/oct rolloff). Synchronous filters available below 200 Hz.

#### Internal Oscillator

- **Range**: 1 mHz to 102 kHz
- **Accuracy**: 25 ppm + 30 μHz
- **Frequency resolution**: 4½ digits or 0.1 mHz, whichever is greater
- **Distortion**: -80 dBc (f < 10 kHz), -70 dBc (f > 10 kHz) @ 1 Vrms amplitude
- **Amplitude**: 0.004 to 5 Vrms into 10 kΩ (2 mV resolution), 50 Ω output impedance, 50 mA maximum current into 50 Ω
- **Amplitude accuracy**: 1%
- **Amplitude stability**: 50 ppm/°C
- **Outputs**: Sine, TTL (When using an external reference, both outputs are phase locked to the external reference.)
Displays
Channel 4½-digit LED display with 40-segment LED bar graph. X, R, X-noise, Aux 1 or Aux 2. The display can also
be any of these quantities divided by Aux 1 or Aux 2.
Channel 2 (SR830) 4½-digit LED display with 40-segment LED bar graph. Y, Q, Y-noise, Aux 3 or Aux 4. The display can also
be any of these quantities divided by Aux 3 or Aux 4.
Offset X, Y, R can be offset up to ±105 % of full scale.
Expand X, Y, R can be expanded by 10× or 100×.
Reference 4½-digit LED display

Inputs and Outputs
CH1 output ±10 V output of X, R, X-noise, Aux 1 or Aux 2. Updated at 512 Hz.
CH2 output (SR830) ±10 V output of Y, Q, Y-noise, Aux 3 or Aux 4. Updated at 512 Hz.
X, Y outputs In-phase and quadrature components
(rear panel) (±10 V), updated at 256 kHz
Aux. A/D inputs 4 BNC inputs, ±10 V, 1 mV resolution, sampled at 512 Hz
Aux. D/A outputs 4 BNC outputs, ±10 V, 1 mV resolution
Sine Out Internal oscillator analog output
TTL Out Internal oscillator TTL output
Data buffer Two 16k point buffers. Data is recorded at rates to 512 Hz and read through the computer interfaces.
Trigger In (TTL) Trigger synchronizes data recording
Remote pre-amp Provides power to the optional SR550, SR552 and SR554 preamplifiers

General
Interfaces IEEE-488.2 and RS-232 interfaces standard. All instrument functions can be controlled and read through
IEEE-488.2 or RS-232 interfaces.
Power 40 W, 100/120/220/240 VAC, 50/60 Hz
Dimensions 17" x 5.25" x 19.5" (WHL)
Weight 23 lbs.
Warranty One year parts and labor on defects in materials and workmanship

Terms and Conditions:

1) The Lock-in-Amplifier will be used in University for purely academic and research purpose. So maximum educational discount must be given.

2) Quotation must be provided on Direct Shipment Basis. (if applicable)

3) Payment- By Wire Transfer in USD in advance. (if applicable)

4) Quotation must include Air Freight Charges, Insurance and Packaging charges in USD up to CIP Kolkata Airport. (if applicable)

5) Custom clearance will be undertaken by the University. (if applicable)

6) Unpacking and successful Installation with demonstrations onsite at free of cost must be done by the Bidder.

7) Standard Company Warranty must be provided.