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**MEMORANDUM OF TRANSMITTAL**

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CONTRACT/GRANT NUMBER: DAAD19-00-1-0010

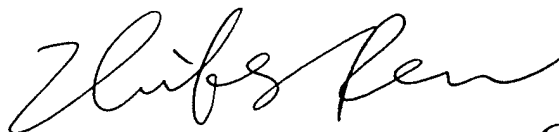
REPORT TITLE: Final Report

is forwarded for your information.

SUBMITTED FOR PUBLICATION TO (applicable only if report is manuscript):

Sincerely,

Z. F. Ren  
Department of Physics  
Trustees of Boston College  
McGuinn Hall 600  
Chestnut Hill, MA 02467



01/08/2001

20010306 016

Enclosure 4

**Purchase of Transmission Electron Microscope**

(Final Progress Report from Boston College)

Z. F. Ren

Jan. 8, 2001

U.S. ARMY RESEARCH OFFICE

GRANT NUMBER: *DAAD19-00-1-0010*

Trustees of Boston College  
McGuinn Hall 600  
Chestnut Hill, MA 02467

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Fund of \$200,000 was requested to pay part of a Transmission Electron Microscope (TEM) which costs about \$1.35 million. The balance comes from various other sources. The machine has been scheduled for delivery in March 2001.

The items paid by this grant are listed as 2, 7 – 12, and 17 in Jeol's quote. The total cost was \$210,205. There was a discount of \$10,205 so the final cost was \$200,000.

The TEM will be used to assist all the research projects described in the original proposal and any other future DoD funded projects.

# JEOL • QUOTATION

JEOL USA, INC. • P.O. BOX 6043 • 11 DEARBORN ROAD • PEABODY, MA 01961-6043 • TEL (978) 535-5900 • FAX (978) 536-2205

Dr. Zhifeng Ren  
Boston College  
Physics Dept.  
Chestnut Hill, MA 02167

Quotation No. 6061-1

Quotation Date December 27, 1999

Price Valid 30 Days

ITEM	Your Inquiry No.:		Date:	
	QTY.	DESCRIPTION	PRICE	
1	1	<b>FASTEM:2010F</b>	DF	1,015,000.00
		FE TRANSMISSION ELECTRON MICROSCOPE	DIA	24,100.00
		Consisting of the following:		
		A. 200kV maximum accelerating voltage with semi-continuous HV control, 50eV/step minimum		
		B. Electron Gun Assembly:		
		Schottky FEG Emitter - Zr/W<100>		
		Emitter temperature: 1600-1800K		
		Probe current - 0.5nA/1nm (at FWHM)		
		C. FastEM System: comprised of a 400MHz Pentium II or equivalent Server Computer, 17" flat screen monitor, reduced knobset, joystick, and FastEM software. FastEM provides complete fast external computer control of all microscope operating conditions and specimen stage. It replaces the existing microscope operating system and provides new, improved computer control including complete remote control when the required remote control accessories are purchased		
		D. Specimen Anticontamination Trap		
		E. Differential Vacuum System utilizing Sputter Ion and Diffusion Pumps, Microprocessor Controlled, featuring "radial evacuation" of the specimen area		
		F. Eucentric Motorized 5 axis Side Entry Goniometer:		
		1. Side Entry Goniometer		
		2. Choice of one of the following:		
		- Ultra High Resolution Pole Piece		
		0.19nm, ±30° tilt x or y; 0.12 steradian solid angle; 25° take-off angle		
		- Analytical Pole Piece:		
		0.23nm ±40° tilt x and y; 0.12 steradian solid angle; 25° take-off angle		
		- High Tilt Analytical Pole Piece		
		±50° tilt, 0.14nm lattice and 0.25nm point resolution guaranteed		
		3. Encoded X, Y, Z and tilt axes		
		G. Independently controlled consenser minilens to		

[ 1 ]

DF = Duty Free; DP = Duty Paid; ND = No Duty; DIA = Duty If Applicable

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	QTY.	DESCRIPTION	PRICE	

- allow variable convergence angle selection (JEOL alpha sector)
- H. Motorized Objective Aperture
  - I. High Contrast Objective Aperture (Lower position in the Objective Lens) for high contrast imaging and/or simultaneous EDS/high resolution/high contrast imaging
  - J. Double Tilt Holder (Low Background Optional)
  - K. Single Tilt Holder (Low Background Optional)
  - L. High Resolution Dark Field Imaging ( $\pm 5^\circ$ )
  - M. Zoom Focus and Stigmatism
  - N. Electromagnetic TEM Image Shifting
  - O. Independent Lens "Free Run" Control
  - P. Optimum under focus with variable focus step
  - Q. Automatic through focus
  - R. Minimum Dose System
  - S. Beam Stop
  - T. Automatic Exposure System allowing variability of either brightness or time (electron current measuring type with both average and spot metering)
  - U. Automatic Sheet Film Camera (3 1/4" x 4") including (2) each light-tight loading and receiving boxes and 100 cassettes (A50N)
  - V. Compete Data Recording on negatives, including kV, magnification, film number, scale, and operator code and label
  - W. DHM-40 Digital Hour Meter for instrument time and filament time monitoring
  - X. External Computer Control Interface
  - Y. Video Printer to record microscope operating conditions
  - Z. Fully Automatic Vacuum System ( $10^{-8}$  torr) with Penning Gauge
  - AA. Air Compressor
  - BB. EMDSC-U10A Film Desiccator
  - CC. Haskris Water Recirculator (specify air or water cooled at time of order)

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	QTY	DESCRIPTION		PRICE
		DD.Operator's Chair		
		EE.Installation and proof of resolution guaranteed in customer's laboratory		
		FF.One year all parts and labor warranty (begins with customer's first use of the instrument)		
		GG.4 day user's course at JEOL, including tuition and supplies for one person		
		HH.One set of operator's manuals		
		( 281018-1 )		
2	1	EM-24015(SID2F) SCANNING IMAGE OBSERVATION DEVICE/ASID ( 281034 )	DF DIA	77,540.00 2,450.00
3	1	EM-31041(STHB) UPGRADE TO DOUBLE TILT BERYLLIUM HOLDER ( 283380 )	DF DIA	15,000.00 560.00
4	1	GAT-794.10BY.2 1K X 1K MULTI-SCAN CCD CAMERA ( GAT-794.10BY.2 )	ND	68,480.00
5	1	GAT-700.00P33 DIGITALMICROGRAPH SOFTWARE FOR W95/NT ( GAT-700.00P33 )	ND	4,810.00
6	1	GAT-799.00001 PCI BUS DATA ACQUISITION MODULE ( GAT-799.00000 )	ND	5,890.00
7	1	GAT-622.SC YAG/FIBER OPTIC TEM TV SYSTEM ( GAT-622.SC )	ND	38,115.00
8	1	GAT-05021 HIGH RESOLUTION, 1000 LINE FLAT SCREEN ( GAT-05021 )	ND	2,030.00
9	1	GAT-794-622.T INSTALLATION & TRAINING OF THE 794 & 622 ( GAT-794-622.T )	ND	7,160.00

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ITEM	Your Inquiry No.:		Date:	
	QTY	DESCRIPTION		PRICE
10	1	EDX-RTEM/SUTW SAPPHIRE MOTORIZED RETRACTABLE DETECTOR: ( EDX-RTEM/SUTW )	ND	34,060.00
11	1	EDX-PV9830/10 EDAM III: EDX DATA ACQUISITION MODULE ( EDX-PV9830/10 )	ND	35,780.00
12	1	GAT-ES001-2.0 EMISPEC VISION BASE DATA ACQUISITION ( GAT-07968 )	ND	17,700.00
13	1	GAT-ES003-2.0 EDX SPECTROSCOPY OFF-LINE PACKAGE ( GAT-07969 )	ND	10,600.00
14	1	GAT-ES010-2.0 SPECTROSCOPY & IMAGING OFF-LINE PACKAGE ( GAT-09644 )	DF	3,800.00
15	1	GAT-ES011-2.0 EMISPEC OFF-LINE EDXS QUANTIFICATION ( GAT-09645 )	ND	3,500.00
16	1	GAT-799.00001 PCI BUS DATA ACQUISITION MODULE ( GAT-799.00000 )	ND	5,890.00
17	1	GAT-711.T EMISPEC INSTALLATION AND TRAINING: ( GAT-ES-T )	ND	6,880.00

SUB-TOTAL: 1,352,235.00

Less Donation to BC Physics Dept.: -352,235.00

NET GRAND TOTAL: 1,000,000.00

Duty If Applicable: 27,110.00

FOB: Destination/Loading Dock

Prices quoted do not include any applicable sales  
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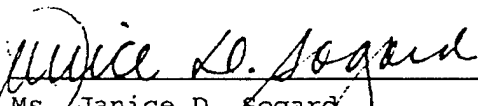
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## OPTIONALLY AVAILABLE

1	1	GJ-700-72-125 UNINTERRUPTIBLE POWER SUPPLY Warranty on all JEOL items is 12 months from the date of their installation and acceptance by the user.	ND	15,000.00
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Payment: 90% Net 30 Delivery; Bal. Net 30 Acceptance

  
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Z.F. Ren

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Boston College

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## 13. ABSTRACT (Maximum 200 words)

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