



66 -- Multi-Mode Scanning Probe Microscope

General Information

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Contracting Office Address

Department of the Navy, Office of Naval Research, Naval Research Laboratory, 4555 Overlook Ave. S.W., Washington, DC, 20375, UNITED STATES

Description

This is a combined synopsis/solicitation for commercial items prepared in accordance with the format in Federal Acquisition Regulations (FAR) Subpart 12.6, as supplemented with additional information included in this notice. This announcement constitutes the only solicitation; proposals are being requested and a written solicitation will not be issued. The solicitation, N00173-07-R-DB04, is issued as a Request for Proposal (RFP). The solicitation document and incorporated provisions and clauses are those in effect through FAC 2005-16 and DFARS Change Notice 20070426. The associated small business size standard is 500. NRL has a requirement for I each of a Multi-Mode Scanning Probe Microscope under CLIN 0001.
Description: A. Performance And Operation Modes - A multimode scanning probe

microscope (MM-SPM), including scanning tunneling and atomic force microscope (STM and AFM), and capable of performing simultaneous SPM and fluorescence microscopy/spectroscopy imaging is needed for the study of quantum dot and wire architectures, and for biomolecular structures intended for nanophotonic and bio-chemical sensing applications. The complex environments of the application areas require a highly sophisticated SPM, capable of multimode operation both in ambient and at liquid interfaces. Further more, the SPM geometry must allow the integration of an inverted optical microscope in experiments involving tip-enhanced fluorescence and Raman scattering. MM-SPM must be built in a modular design allowing the use of the same scanners in all platforms for stand-alone, inverted light microscopy, environmental chamber and large stage operation. The modularity of MM-SPM is also expected to accommodate upgrades for future capabilities as indicated below. MM-SPM must be able to perform the following imaging modes: STM, AFM, lateral force microscopy (LFM), non-contact AFM (NC-AFM), current sensing AFM (CS-AFM), electric force microscopy (EFM) and magnetic force microscopy (MFM)

The AFM in stand alone configuration must have a demonstrated atomic resolution, defined as resolving a mica lattice in contact AFM mode. The SPM head shall accept both STM tips and commercially available AFM cantilevers. Available non-contact AFM techniques must include both acoustic and magnetically coupled modes. The SPM instrument must have multi-mode operation capabilities, i.e., simultaneous AFM-fluorescence imaging and current sensing AFM (CS-AFM). CS-AFM must be available with a minimum current range of 0.1 nanoAmps to 100 microAmps. An environmental chamber must be available to be integrated with the microscope head for fast sample loading, with a gasket seal for complete isolation of gases in the chamber from the scanner and have a minimum of eight ports for gas and/or electrical connectors. The chamber must be constructed of optically transparent and solvent, acid, and base resistant material to allow viewing of the sample during operation. Heating and cooling options must be available for air and solution imaging. Available CS-AFM measurements must be carried out under controlled environment and at a controlled temperature to enable molecular resolution.

B. Spm Hardware - STM/AFM scanner must be suitable for STM, AFM contact and AFM non-contact mode imaging, consisting of a scanner with the minimum x-y -range of 90 micrometers 90 micrometers and the z-range of 7 micrometers. Optional scanners must be available in x-y scan ranges from atomic scale imaging to 90 micrometers 90 micrometers. MM-SPM must have a near-IR laser diode for deflection detection of an optical cantilever with an emission wavelength between 800 and 900 nm. All scanner and detector electronic components must be separated from the sample environment. In particular, the microscope head must have provision for hermetically sealed scanner assemblies.

Microscope head must be adaptable to inverted light microscope stage, stand- alone, video microscope and environmental chamber configurations. Microscope head must have 90 degree optical view for tip placement and laser alignment. Microscope head must have an optical window for allowing laser signal and optical viewing while submerged in fluid or imaging in gases. MM-SPM set-up must facilitate two-dimensional coarse positioning of the sample stage with minimum x-y range of 4 mm 4 mm. MM-SPM set-up must include a vibration isolation chamber. MM-SPM set-up must allow integration with a commercially available inverted optical microscope, such as Nikon TE 2000; Olympus IX 51, 70, 71, 81; and Zeiss Axiovert 200. Adaptors for integrating MM-SPM with an inverted microscope must be provided. The sample plate must accommodate samples of at least 20 mm in diameter. Sample plates must be available with options for heating, cooling, and electrochemistry and must be compatible with fluid cells described elsewhere. Sample plates must also have quick clamp holders for all electrochemical electrodes. A fluid cell must be available for interchangeable sample plates for heating, cooling and magnetically-coupled NC modes. For electrochemical measurements, a real half-cell reference electrode shall be available with the fluid cell. The fluid cell should be held with quick clamp mechanism for fast assembly. Sample environment must allow combinations of

environmental conditions, such as electrochemistry, heating, and gas environment. A video microscope for beam alignment and tip approach monitoring, consisting of a CCD camera, an objective lens and a light source must be included in the MM-SPM instrumentation.

C. Spm Control Electronics And Software- SPM control unit for MM-SPM operation must utilize a USB interface. The selection of open/closed loop control of the scanning head must be available through the SPM control software. MM-SPM instrumentation shall include a Windows XP workstation with specifications to a current standard and two flat panel displays. The workstation must have the SPM control software package installed, including free upgrades for a minimum of two years after delivery and installation. With the delivery, the contractor shall provide installation of the SPM instrumentation, training and the demonstration of the performance of AFM methods to the specifications as listed above

Delivery and acceptance is at NRL, Washington, D.C. 20375, FOB Destination. Delivery shall be no later than 120 days from date of award. The provision at 52.212-1, Instructions to Offerors-Commercial, applies to this acquisition. The provision at FAR 52.212-2, Evaluation--Commercial Items is incorporated. The Government intends to award a contract resulting from this solicitation to that responsible offeror whose offer conforming to the solicitation will be the most advantageous to the Government, price and other factors considered. The following factors shall be used to evaluate the offers: (i) Technical capability of the item offered to meet the Government's requirement; (ii) Past Performance; and (iii) Price. Technical capability and Past Performance, when combined, are more important than price.

Offeror must complete and submit with its proposal, FAR 52.212-3 Offeror Representations and Certifications--Commercial Items and DFARs 252.212-7000 Offeror Representations and Certifications--Commercial Items., which are identified as B and available electronically at : <http://heron.nrl.navy.mil/contracts/repandcerts.htm>

The clause at FAR 52.212-4, Contract Terms and Conditions-Commercial Items and FAR 52.212-5, Contract Terms and Conditions Required To Implement Statutes or Executive Orders--Commercial Items, applies to this acquisition. The additional clauses cited within this clause are applicable: 52.203-6, 52.219-4, 52.219-8, 52.222-3, 52.222-19, 52.222-21, 52.222-26, 52.222-35, 52.222-36, 52.222-37, 52.222-39, 52.225-13 and 52.232-33 The DFARs clause at 252.212-7001, Contract Terms and Conditions Required to Implement Statutes or Executive Orders Applicable to Defense Acquisitions of Commercial Items applies to this acquisition. The additional clauses cited within this clause are applicable: 52.203-3, The following additional DFARs clauses apply: 252.225-7012 , 252.227-7015, 252.227-7036, 252.227-7037, 252.232-7003, 252.243-7002, 252.247-7023, and 252.247-7024. The following additional FAR and DFARs clauses apply: 52.204-7 Central Contractor Registration, 252.204-7004 Alternate A, and 252.211-7003 . Proposals may be transmitted by e-mail to Dan.Brinkworth@nrl.navy.mil in either Microsoft Word or pdf format. All EIT supplies and services provided under any resultant contract must comply with the applicable accessibility standards issued by the Architectural and Transportation Barriers Compliance Board at 36 CFR part 1194 (see FAR Subpart 39.2). Electronic and information technology (EIT) is defined at FAR 2.101.

Any resultant contract will be DO Rated under the Defense Priorities and Allocations System (DPAS). The Contract Specialist must receive any questions concerning the RFP no later than five (5) business days before the response date of this solicitation. An original and two (2) copies of the offeror proposal shall be received on or before the response date noted above, 4:00 P.M., local time at the NRL address above, Attn: Contracting Officer. The package should be marked with the solicitation number, due date and time.

The U.S. Postal Service continues to irradiate letters, flats, Express and Priority Mail with stamps for postage and other packages with stamps for postage destined to government agencies in the ZIP Code ranges 202 through 205. Due to potential delays in receiving mail, offerors are

encouraged to use alternatives to the mail when submitting proposals.
Other business opportunities for NRL are available at our website
<http://heron.nrl.navy.mil/contracts/rfplist.htm>

Point of Contact

Daniel Brinkworth, Contract Specialist, Phone 202-767-6746, Fax 202-767-6197, Email
dan.brinkworth@nrl.navy.mil

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