STATEMENT OF WORK/REQUIREMENTS DOCUMENT
Title: Nitrogen RF Plasma Source
Requesting Lab: Physical Measurement Lab (PML), Applied Physics Division, 686

I. BACKGROUND INFORMATION

NIST's Quantitative Nanostructure Characterization Group synthesizes semiconductor nanostructures and thin films with molecular beam epitaxy. This process requires a stable nitrogen RF plasma source for epitaxial growth of gallium nitride (GaN), aluminum nitride(AlN), and related AlGaN alloys. The materials produced will enable low defect density test structures for identifying and mitigating defects in GaN/AlGaN semiconductors. These semiconductors are used by U. S. industry to manufacture defense and civilian high-speed communication systems, high-reliability electrical power systems, and medical sterilization and diagnostic equipment, among other uses. Using this equipment, the group will develop new metrology methods to improve the reliability and performance of semiconductor devices used in those industries. The equipment is also critical in the production of NIST Standard Reference Instrument 6012, Precision Semiconductor Nanostructures.

Purpose/Objective: This procurement is for the purchase of a nitrogen RF plasma source compatible with installation on our Veeco GEN 10 molecular beam epitaxy system. The source should include an RF autotuning unit and RF power supply. This source is required for fabrication of GaN and AlGaN layers and nanostructures critical to NIST metrology research programs.

II. SCOPE

The Contractor shall deliver a quantity of one nitrogen RF plasma source, autotuning unit, and RF power supply, inclusive of FOB Destination delivery and warranty.

III. MINIMUM REQUIREMENTS

The Contractor shall provide a system that meets all technical specifications identified below. All items must be new. Used or remanufactured equipment will not be considered for award. Experimental, prototype, or custom items will not be considered. The use of "gray market" components are not authorized for sale in the U.S. by the Contractor is not acceptable. All line items shall be shipped in the original manufacturer's packaging and include all original documentation.

Line Item 0001:
Description: RF Plasma Source
Quantity: 1

A. Technical Specifications

RF plasma source for nitrogen gas compatible with installation on Veeco Gen 10 molecular beam epitaxy system:

(1) Source shall have a 4.5" CF flange, and
(2) Water cooling on the RF feedthrough and coil.
(3) All pyrolytic boron nitride (PBN) construction plasma chamber and aperture
(4) Field-replaceable PBN aperture or aperture-tube combination
(5) Aperture plate with multiple holes
(6) Aperture design provided by vendor for high uniformity over 76 mm diameter substrate at a distance of 8.75" source-to-substrate distance
(7) In-vacuum length 12.5 inches (317.5 mm) (from flange to tip)

(8) In-vacuum diameter 2.09 inches (53 mm) or less
(9) Proven growth rate of range from 0.2 μm/h to 2 μm/h for GaN in a similar MBE system
(10) Compatible with Molly Software Control
(11) Ultrahigh vacuum construction

Line Item 0002:
Description: RF Power Supply
Quantity: 1

B. Technical Specifications

(1) Compatible with items 1 and 3
(2) 600 W maximum power
(3) Appropriate cables to source and autotuner included
(4) Interlock circuit provided to cut power when water flow fails

Line Item 0003:
Description: Autotuner
Quantity: 1

C. Technical Specifications

(1) Compatible with items 1 and 2
(2) Designed to provide RF load matching over normal range of operation of source

IV. DELIVERABLES

Description	*Quantity or Format*	*Due Date*
Items 1 through 3 above	1 each	18 weeks ARO

V. PLACE OF PERFORMANCE

All work shall be performed at the contractor's facility. No access to NIST site is necessary for this contract.

VI. PERIOD OF PERFORMANCE/LEAD TIME

The lead time for this procurement is 18 weeks after receipt of order.

VII. DELIVERY TERMS

Delivery shall be F.O.B Destination and shall occur in accordance with the delivery due dates provided in the above table.

FOB Destination means: The contractor shall pack and mark the shipment in conformance with carrier requirements, deliver the shipment in good order and condition to the point of delivery specified in the purchase order, be responsible for any loss of and/or damage to the goods occurring before receipt and acceptance of the shipment by the consignee at the delivery point specified in the purchase order; and pay all charges to the specified point of delivery. The contractor shall deliver all Line Items to:

DOC/NIST

Shipping & Receiving
325 Broadway St.
Attn: Kris Bertness, 81/1C102 (lab)
Boulder, CO 80305

*****Due to ongoing limited site access of the NIST facilities, the Awardee SHALL confirm with the Designated Government Official and the Contracting Officer prior to ANY shipment to NIST*****

VIII. INSPECTION & ACCEPTANCE

In addition to the inspection and acceptance terms articulated in 52.212-4, the Government reserves the right to perform such performance tests and evaluations as defined below to verify specified system performance. Such tests and evaluations, if performed, shall be conducted within the environment that the system is to be operated. The Contractor has the right to be present during the tests and evaluations, if performed, at the Contractor's expense.

Performance Tests:

1. The equipment has no visual signs of damage to electronics, source head and aperture plate.
2. Necessary cables are included.

NIST may choose at its discretion to forego the above acceptance testing.

A visual inspection of the equipment will be performed by the NIST TPOC to identify surface defects or any form of indication that any equipment was damaged during transport to NIST. The Government shall have sole discretion to require repair or replacement of damaged and/or nonconforming supplies at no cost to the Government. The Government at any time prior to acceptance shall reject the equipment due to defects and/or nonconformance. The vendor is responsible for latent defects discovered any time after final inspection. However, the extent of its liability shall be prorated over the useful life of the equipment.

Ownership of the equipment shall transfer to NIST upon acceptance by the Government.

The Government will test, inspect, and accept or reject the equipment within ten working days of the receipt of the equipment unless otherwise indicated above. The Government reserves the right to conduct quality assurance testing to confirm that a given instrument(s) meets the manufacturer's and/or the Government's performance specifications. It is anticipated that the equipment will meet all manufacturer's specifications and/or the Government's performance specifications identified in the most recent operations and maintenance manual for each piece of equipment and/or in this document.

IX. WARRANTY

The contractor shall warranty the entire system for a period of a minimum of one year after receipt of the equipment and shall be in accordance with terms in FAR 52.212-4. Warranty shall commence upon acceptance of the system by the Government and at a minimum shall include repair or replacement of the source and electronics for manufacturing defects.

X. PAYMENT SCHEDULE

Advance payment is not authorized. The Contractor must invoice in arrears according to the payment schedule. The Contractor shall be paid, in accordance with Net 30-day payment terms, upon receipt and acceptance of a proper invoice, in accordance with the following schedule:

1. 100% after acceptance by the TPOC of fully installed system, AND
2. After the successful completion of the testing requirements set forth in this document under section set forth in this document, AND
3. After successful demonstration by the instrumentation that it performs IAW the technical requirements set forth in this document AND
4. After receiving an invoice submitted properly, IAW the purchase order terms and conditions.

NOTE: Partial shipments and partial invoices will not be accepted, unless otherwise requested and accepted by the Contracting Officer prior to award offer. Proposed payment schedules shall be submitted with vendor's response to the RFQ for consideration.