

Global tender notification for the procurement of “High-precision x-y-z translation stages with a gantry system”

Ref:PH/SBM/512/2021-22

Date: 29/03/2022

This is a notice inviting global tenders for the procurement of “High-precision x-y-z linear translation stages with a gantry system” that will be utilized for building a *femtosecond laser-writing* (also known as *fs laser direct-write*) facility at IISc Bangalore. The required technical details, including terms and conditions, are provided below. The last date of reaching the quotation to us [by post or in-person] is mentioned below.

Specifications:

1. Hysteresis- and backlash-free nanometre-scale three-dimensional motion with excellent velocity stability and software-based tracking capabilities.
Maintenance-free long-term performance is required.
2. Maximum translation in x-y (i.e., in the horizontal plane): ≥ 150 mm
3. Maximum translation in z (i.e., along the vertical direction): ≥ 5 mm
4. Resolution i.e., minimum incremental motion in x, y and z: ≤ 2 nm
5. Speed: At least up to 75 mm/s. During *fs laser-writing*, the stages should move along a well-defined three-dimensional path with a given speed.
6. Accuracy: ± 0.3 micrometre or better along x, y and z
7. Repeatability: ± 0.1 micrometre or better
8. Load on stages: At least up to 3 kg
9. In position stability: approximately 1 nm.
10. Speed stability: As good as possible. Please furnish the details. While moving at a speed of approx. 75 mm/s with a payload of approx. 1 kg, the fluctuation of velocity is preferred to be less than $\pm 5\%$ of its max value.

11. System integration and gantry system:

- a) The vendor/company should provide a complete factory set integrated system – i.e., all components (e.g., drive, controller, and stages) should be integrated as one unit. Testing and documentation should be done using the complete system i.e., after assembling all components. The vendor/company may be asked to perform *fs laser-writing* of complicated waveguide networks for quality checks.
- b) Integration Type: Test as System

- c) The above specifications 2-10 should be valid for the complete integrated system.
- d) Layout of the stages: All three stages should be built as one unit *on top of each other*.
- e) Concrete base & gantry: Stages should be mounted on and attached to a thick (>4 inches) granite base. A robust granite gantry (with M6 screw holes) should be attached to the base for mounting optical components.
The base, gantry and stages should be assembled as one unit in the factory. System drawings will be confirmed before placing the order.

12. Include pictures of the exact system being offered

- 13. Mode of operation: Software controlled; compatible with G-codes
- 14. The vendor/company should provide software-based motion controllers, compatible with its motion development interface. The software should be user-friendly and capable of tracking motion paths, speed, acceleration, etc. Please furnish the details.
- 15. Please quote separately for a rackmount PC compatible with the system.
- 16. Please quote separately for on-site installation.
- 17. All accessories such as necessary software, connectors, adapters, cables etc. required for the independent operation of the system should be included.
- 18. Operating voltage, frequency: 220 VAC, 50 Hz
- 19. Warranty: 1 year. Please quote for extending the warranty period for an additional one (i.e., total of two) as well as two (i.e., total of three) years.
- 20. Position synchronised output (PSO) is required with high speeds and low latencies (furnish the details). The controller should be able to trigger other external equipment (such as acousto-optic modulators (AOM), industrial lasers, cameras, etc) **based on the actual distance travelled by the stages.**
- 21. Fibre-optic motion bus: In motion control, a fibre optic communication bus is required with less than 1 nano-second jitter, offering reliable communication that is immune to electromagnetic interference.
- 22. Crossed roller bearing x-y-z stages are preferable for greater stiffness and repeatability compared to recirculated ball bearings
- 23. The following features are preferable: (a) One-click servo tuning algorithm for easytune, (b) Multipliers up to x65536, capable of sub-nanometre electrical resolution, (c) Programmable libraries which execute at the firmware level.

Terms and conditions:

1. The bid should be submitted in a two-cover system, i.e., technical bid and commercial bid separately in sealed covers. The technical bid should contain all commercial terms and conditions, **except the price.**
2. The technical bid must contain a point-by-point technical compliance document. The technical proposal should contain a compliance table that should describe your compliance in a "yes" or "no" response against each specification. If "no" the second column should mention the extent of the deviation. The third column should state the reason for the deviation, if any. The fourth column can be used to compare your tool with that of your competitors or provide details as requested in the technical requirement table below. **Tender documents without technical compliance documents will not be considered.**
3. In the commercial bid, the price should be inclusive of all discounts.
4. The vendor/company should have a track record of having previously supplied **at least ten similar equipment** (i.e., high-precision linear stages) in India in the past five years (please furnish the details). It would be desirable to provide two reference letters from customers in India.
5. The vendor/company should have supplied similar *high-precision linear stages with a gantry system* for the purpose of *fs laser-writing of optical waveguides* in well-known national/international institutes/universities (please furnish the details e.g., published articles in reputed international journals [with impact factor > 3.0] mentioning that a similar product has been used for fs laser-writing of optical waveguides).
6. The vendors quoting should ideally be registered with IISc, and the quote should ideally carry the vendor registration number in the bid.
7. Lead time should be clearly mentioned in the technical and commercial bids.
8. The offer shall be valid at least 90 Days from the date of opening of the commercial bid.
9. The vendor/company should have existence for a minimum of 3 years. (Enclose Company Registration Certificate).

10. The vendor/company must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere.
11. The quotations should be on C.I.P. Bangalore basis (by Air Freight only). Please provide Itemized cost of the system and required accessories. The quotation should mention the terms of delivery, delivery schedule, estimated delivery date, and payment terms.
12. The Institute reserves the right to accept or reject any bid, or to annul the bidding process and reject all bids, at any time prior to the award of contract without thereby incurring any liability of the affected bidder or bidders.
13. Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the rights:
 - a. To accept OR reject lowest tender or any other tender or all the tenders.
 - b. To accept any tender in full or in part.
 - c. To reject the tender, offer not confirming to the tender terms.
14. The tender documents can be sent at the following address by post or in-person, and the document should reach us on/before **25 April 2022**.

The Chairman
Department of Physics
Indian Institute of Science,
Bangalore 560012, Karnataka, India
Attention: Seababrata Mukherjee