

INDIAN INSTITUTE OF TECHNOLOGY KANPUR
Department of Chemical Engineering

Enquiry No.: IITK/CHE/NT/2014-2015/05

Opening Date: 27/11/2014

Closing Date: 16/12/2014

Sub: Particle Imaging System for velocity measurements

The system should utilize a method and apparatus for measuring fluid motion with micron scale spatial resolution by injecting the micron or submicron solid fluorescent particle which closely follows the motion of the fluid. The fluorescent particles must absorb the excitation light and emit pulses of fluorescent light, at the emission wavelength which is collected by a microscope objective lens, and relayed through a fluorescent filter to an image recording device, using a CCD camera. These images can then be analyzed using ensemble correlation analysis, background removal and related technology to obtain velocity (PIV) measurements.

The specifications of main components:

- **Laser Source:** Dual cavity Nd:YAG 532nm wavelength laser.
 - Energy: ~ 70mJ
 - Repetition rate: 15 Hz
 - Pulse - Pulse Stability ($\pm\%$) < 2
 - Beam Diameter (mm) < 5
 - Beam Divergence (mrad) < 4
 - Pointing Stability (μ rad) < 100
 - Lamp Life (pulses) ~ 100 million shots
 - Pulse Width (ns) < 10

- **CCD Camera** for image acquisition:
 - Max. Resolution: 8MP
 - Frame rate: 8.5fps
 - Inter-frame time \leq 200ns
 - Pixel size \leq 5.5 μ m
 - Lens: 50mm/F1.8
 - Necessary interface card and cables

- **Synchronizer:**
 - Output channels: 8
 - Input channels: 2
 - Resolution: \leq 0.3 ns
 - Trigger: External
 - Communication: USB/RS 232

- **Inverted Microscope and accessories:** with high contract optics for Micro-PIV measurements, light guide & halogen input module, F-mount camera adaptor and 2x relay lens.
 - Objective lenses: 10x, 20x, 40x.
 - Traverse/focus mode: manual
 - Light source: Both laser and halogen. User select.
 - Liquid light guide assembly and coupling accessories to be used with the microscope and YAG laser, 2 meters long and 5 mm aperture
 - Necessary filters/attenuators
 - Compatible to Time Resolved micro-PIV upgrades
 - Preferred make: Olympus/Nikon

- **Long distance Microscope and accessories:** Long distance microscope with necessary objective lens & accessories to execute velocity measurements in vertical OR inclined micro channel fluid flows along with a heavy-duty tripod. Provide suitable FOV estimates with its working distance for various objective lens options compatible with 8MP camera.

- **Software:** Necessary software for image acquisition, processing and analysis.
 - Distributed processing of captured PIV Image
 - Analysis and parallel processing capability

- Normal/Hart Correlation analysis
 - Background removal
 - Detailed time-series analysis
 - Integrated Tecplot data presentation
 - Software module to provide processing 2D-PIV image capture, analysis and display.
- **Computer:** Dual Intel Xeon X3430 Quad-Core 2.40Ghz processors, 6GB DDR3 RAM, 1TB HDD, 22" monitor, Windows 7 64-bit Enterprise Edition.
 - **Fluorescent seed particles** of 1, 3, 5, 10 microns.
 - **Micro flow model** and accessories kit.
 - **Availability of after sales service and support in India:** Supplier has to compulsorily indicate details of facilities / expertise/ qualification of support staff in India. Factory trained engineer/s should be available in India for complete product support.
 - **Warranty:** Minimum TWO year. The warranty should also include at least three visits per year by factory trained engineer/s for periodic maintenance and support in application customization.

Other Tender Criteria

- Authorization certificated required along with the Quotation
- Only Experienced Bidder (who have supplied micro-PIV systems within India) can quote. List of existing customers should be provided alongwith.
- Technical and financial details should be in separate envelope. In the document for technical bid, mention in tabular form the compliance to each of the above specifications.
- All quotations must reach undersigned on or before 16/12/2014 at 1500 hrs.
- Quotation must be valid for 90 days.
- Delivery period should not be more than **8 weeks**.
- IITK is exempted from excise/custom duty.
- Send complete detail of the product(s).
- Warranty/Guarantee should be clearly mentioned.
- Payment terms will be as per IIT Kanpur rules.
- The rate quoted should be inclusive of sales tax and other taxes including freight charges (if any).
- All prices are to be FOB to the nearest international airport to the shipping facility.
- The Institute reserves the right of accepting or rejecting any quotations without assigning any reason thereof.

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