

Technical specification for proposed

IPCE Spectrometer

Type of measurement	External quantum efficiency (EQE) /Incident Photon to Charge Conversion efficiency (IPCE) /Spectral Response of Solar cells
Light Source	<p>Xenon Arc lamp(300W) Should be CE certified and should compliant with RoHS. Power Supply should have Constant Power or constant Current modes. USB or RS-232 communication is preferable. Light Source should include all necessary items like lamp housing, Power supply, lamp etc. Line regulation of the Power Supply should be $< \pm 0.1\%$ Light Ripple should be $< 1\%$ RMS Lamp power supply should be able to use with 200 to 500 watt arc lamps for future upgrades Lamp power Supply should be adjustable to change wattage of the lamps. Should have safety interlocks for accidental UV exposure.</p>
Step Size	Step size should be minimum of 10 nm
Monochromator	<p>Spectral range: 300-1100 nm and preferably up to 1800 nm(optional) Atleast two gratings should be installed and aligned and should come with calibration report. Spot size:$> 0.5 \times 2$ mm(rectangular at focus) USB and/or RS-232 control or equivalent Wavelength accuracy : < 1 nm Focal length: ≥ 130 mm F# should be lower than F/4 Stray light should be $< 0.05\%$ Should be compatible with all other items like Source, Filter wheel etc.</p>
Lock-in Amplifier	SRS Lock-in Amplifier (Preferably SR810 or higher version)
Current Preamplifier	<p>Variable gain: $10^4 - 10^9$ V/A</p> <ul style="list-style-type: none"> ➤ Maximum Output: ± 10 V ➤ Accuracy $\pm 1\%$ ➤ Linearity $\pm 1\%$

	<ul style="list-style-type: none"> ➤ Bandwidth DC – 100 kHz ➤ Equivalent input current noise: $<2.3 \times 10^{-12} \text{ A Hz}^{-1/2}$ ➤ Fully software-programmable ➤ Maximum Input Impedance 8000 at 10^9 V/A ➤ BNC input connector
Optical Chopper	<p>Chopping range – 4 Hz to 500 Hz</p> <p>Internal Synthesizer stability 100 ppm after one hour warm up.</p> <p>Resolution should be 3 digit.</p> <p>-180 Deg to +179 Deg Phase Shifter with 0.1 Deg resolution.</p> <p>And with harmonic and sub harmonic locking feature.</p>
Filter wheel	<p>An automated 5 position filter wheel with filters should be supplied. ~350 and 600 nm Order sorting filters should be supplied (min). Should be synchronized with QE software for filter selection.</p>
Reference cell	<p>System should come with QE test cell for testing purposes.</p>
Reference Detector	<p>NIST traceable Calibrated Si Detector for 300-1100 nm. It should come with Transimpedance amplifier having gain from 10^4 to 10^9 V/A. Bandwidth should be 0.01Hz to 100KHz</p>
Optical Bench and other necessary mounting and coupling optics and Opto-mechanics	<p>If the quoted solution is components based system, Optical Bench should be supplied for mounting the components. And other necessary mounting and coupling optics and Opto-mechanics should be quoted with details and models and make.</p> <p>Please give us the complete details of the quoted items and design of the system.</p>
System control & software	<p>Software controlled data acquisition</p> <p>Direct reports of measurement results including SR, IPCE and EQE</p> <p>Following options should be available in the software control:</p> <ul style="list-style-type: none"> Monochromator grating selection Automatic bandpass selection Motorized filter selection Wavelength unit selection Wavelength offset Monochromator shutter control QE detector and preamplifier gain setups
Other details	<p>Similar to Quoted model Should have been supplied within India and atleast 3 customer detail and POs for proof of supply of components</p>

	<p>should be provided. Systems should have been supplied in IITs and Central Universities.</p> <p>Users reference should be submitted with the offer.</p> <p>OEM should be ISO certified</p> <p>Item should have CE certification wherever it is necessary.</p> <p>Company should have trained service engineers for installation, preferably in South India.</p> <p>Company should have representative in India and should have service persons for speedy service.</p> <p>A detailed compliance certificate against each specification needs to be provided by the vendor along with the technical brochure</p>
General	<ol style="list-style-type: none"> 1. The system should have safety compliance should be according to ISO. 2. All pre installation requirements (table size, power supply etc.) should be clearly mentioned in the quotation. 3. Soft and hard copy of the manual should be provided with the instrument. 4. Test report of the instrument should be provided. 5. Free installation training session at customer site is required. 6. Warranty: minimum 1 year