

Detailed specifications for equipment for the project titled “Optical spectroscopy of trapped (and patterned) nano-particles and (macro)molecules in solution” sponsored by SERB, DST (File No. ECR/2016/000467) and IISER Mohali:

PART: I

1) EM-CCD spectrograph

- i) Focal length: ~200mm spectrograph
- ii) Aperture: ~f/4
- iii) CCD: $\leq 20 \mu\text{m}$ pixel, $\leq 0.2 \text{ nm}$ resolution
- iv) Stray light $< 4 \times 10^{-5}$
- v) Grating size : $< 50\text{mm} \times < 50 \text{ mm}$
- vi) Grating mount : Interchangeable triple grating turret
- vii) Gratings: 1) 1,200 grooves/mm blazed at 500nm, 2) 300 grooves/mm blazed at 500nm, 3) Protected silver mirror
- viii) Back-illuminated EM-CCD
- ix) Dark current @ -550 C, 0.002 e-/p/sec (typical), 0.04 e-/p/sec (maximum)
- x) System read noise: 30 e- rms @ 5 MHz (Electron multiplier mode) 5 e- rms @ 1 MHz (Normal CCD mode)
- xi) Clock-induced charge (CIC): $< 0.005 \text{ e/p/frame}$
- xii) Electron multiplication (EM) gain: 1 to 1000x, controlled in linear, absolute steps
- xiii) Digitization: 16 bits @ 30 MHz, 20 MHz, 10 MHz, 5 MHz, 1 MHz & 100 kHz
- xiv) Entrance and Exit slits: Standard manual (10 μm – 3 mm)
- xv) Reduced aberration (coma and astigmatism); Astigmatism $< 100 \mu\text{m}$
- xvi)
- xvii) Accessories for calibration: Lamp, etc
- xviii) Computer interface: USB and RS232
- xix) Operating software for spectral calibration and spectral kinetics measurement must be included
- xx) Free crop mode data acquisition must be enabled for fast measurements
- xxi) Software Developer Kit (SDK) (for interfacing with LabVIEW and Matlab) must be included

Udit Lee verde
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