

# **Proposal for new CCD Detector for OMR Spectrograph at VBT**

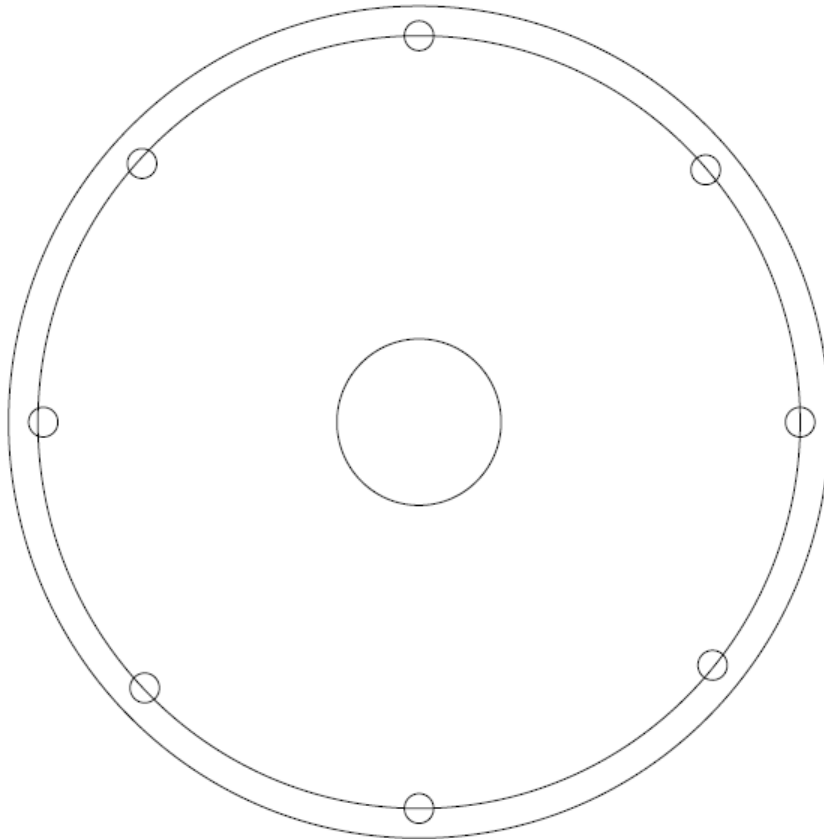
## **Specifications for the proposed CCD System**

The new system can be thermoelectrically cooled CCD system instead of liquid nitrogen cooled system and since it is mounted on the spectrograph optical axis, the camera should be light in weight less than 10 kg.

- 1. Sensor Back illuminated preferably deep depletion**
- 2. Imaging area            Minimum 27 mm width or higher, imaging area can be square or rectangular**
- 3. Pixel Dimension        Typically 20 micron square pixel**
- 4. Thermoelectrically cooled system capable of reaching -90° C with temperature control at +/- 0.05C precision either with air cooled or liquid cooled unit**
- 5. No shutter is required as there is a shutter mounted inside the spectrograph. TTL output signal for shutter control to be provided in the controller**
- 6. CCD camera should have a custom flange to suit the existing mounting arrangement of the spectrograph. Please refer the drawing attached below**
- 7. Readout speeds required (software selectable) with 16 bit data resolution : options 100 KHZ, 1 MHz and 2 MHz**
- 8. Full well capacity        typical 200 Kilo electrons or more**
- 9. CCD Chip grade        Grade 0 or 1 desired**
- 10. Readout Noise         <3 e RMS for 100 KHz and ~7e RMS for 1 MHz**
- 11. Dark Current          < 5 electrons per pixel per hour at max cooling**
- 12. Distance from spectrograph(route length) is ~ 60 metres, If the hardware interface is USB, the connecting fiber optic interface is required and the system has to be tested with the interface**
- 13. Quantum Efficiency     ~ 90% from 400nm to 800nm (Broadband coated)**
- 14. No interference fringes from 350 nm to 900nm; etaloning performance for this wavelength coverage to be provided in the quote**
- 15. Software selectable Gain settings            Typical 1 and 2 e/ADU (high, medium and low)**
- 16. Variance of Gain with signal   < 6% and Non linearity < 1% at 100 KHz**
- 17. Mounting flange to CCD distance typically around 10 mm, Range is 8mm to 12 mm**
- 18. Software for camera operations to run under windows 8/10, with provision for output files in FITS format and interface for user development (like plug-ins)**
- 19. Liquid circulator with necessary accessories if a pump is required for cooling**

All necessary documents and manuals for the above should be provided.

### Custom Flange



CCD FLANGE OD = 7 in [ 177.8 mm ]

CCD FLANGE THICKNESS = 0.3 in [ 7.62mm ]

FLANGE MOUNTING HOLES PCD = 6.5 in [ 165mm ]

MOUNTING HOLES 0.25in free hole & 0.25in Tapped  
Hole alternate at 45 degrees.

QUARTZ WINDOW APERTURE = 1.4 in [ 36mm ]