EIS Teleconference

EIS–meet–sdt–tc1004
22nd April 1999

Minutes by M. Whyndham, corrected 21/5/99

Present: NRL GAD, KD, JTM, CMB, JS
MSSL JLC, MWT, LKHM, CJM

Optical Design Progress

Two pages of faxed material had been received at MSSL, and one drawing file via email. The meeting discussed these preliminary concepts and results of ray tracing studies. The design referred to is EIS-7, which is a particular optimisation of the basic OAP design.

The drawing (EIS-7t) shows the optical layout in the case of a TOROID grating. The Case of the SVLS grating was also studied.

The spatial and spectral resolution ray-trace results were as shown on Page 2 of the fax. Note that these are not spot diameters, but convolutions including the effect of the detector pixel size, slit width, etc.

The basic OAP design is labelled TRENDY. Note that the EIS-7 has about a factor 2 better spatial resolution than TRENDY. Although the spectral resolution is worse, it is believed (according to KD results) that the effect of this, in terms of statistical precision of obtaining velocities and line broadening information, is such that the deficit can be recovered by an exposure some 20% longer. We also note that the spot sizes are well matched to the detector pixel size.

The resolution figures were computed for a field angle of 120 arc-min from the centre of the FOV.

These are small, but not significant, differences in the total performance between the Toroidal-grating and SVLS-grating cases.

Discussion of the Optical Design

In forming the various designs, the wavelength scale has been determined by the requirement that the wavelength ranges 170-206 Å, and 250-290 Å cover the extents of the baseline detector (the EEV 42-10).

The line spacing of the grating is 4800 lines/mm in these designs.

The smaller grating (80 mm diameter) gives significant advantages in relation to technical risk and cost, compared to the baseline (150 mm diameter).

While it is believed that the grating optic can be produced to the correct figure with little difficulty it was believed that producing a ruling of the desired groove efficiency was much more problematical, and that every effort should be made to increase the likelihood of success.

Thus it was thought that two iterations of manufacture should be planned. It was also thought that the smaller grating of the Toroidal configuration presents the least risk. It was felt that all SVLS grating was by no means a conservative design option.

Other Topics

MWT reported that the impact of having two detectors for the MSSL contribution was still being studied. CJM reported the effect on CCD procurement costs and some of the camera mechanical issues. The details of the impact on the camera electronics will be known soon.

LKHM had examined the idea of using the CCD in frame-transfer mode – so as to avoid the need to incorporate a shutter in the instrument. She found that the image smearing as a result of flare exposures followed by image transfer (assuming that an area of the detector would be marked off for the purpose) would be unacceptable.

It was also felt from a scientific point of view that both detectors should be exposed simultaneously.

MWT had begun discussions with Dave Akin of Lockheed Martin, who will be able to describe the design of the SXT/MDI shutter. It now looks very likely that its best location will be so as to shutter the beam entering or exiting the slit, rather than obscuring the detectors.

Systems Engineering

There is now an urgent need to define the documentation tree for the project, to produce a draft instrument interface document, and to determine and document the requirements for each sub-system. MWT hopes to advance this soon.

RAG has produced a set of draft software requirements – this will be made available for general comment soon.

A further teleconference was scheduled for 4 p.m. BST, Thursday, 29th May. BU will be invited to participate.