



NJOC-VN-189

Position title: Poloidal Charge-Exchange Spectroscopist

Background

This post is for a member of the JET Spectroscopy Group with responsibility for the poloidal charge exchange spectroscopy system. The diagnostic consists of three optical collection systems all of which have lines of sight that pass close to vertically through the neutral heating beams. Two of the systems form an up-down symmetric pair with high spatial resolution and are used to resolve plasma edge flows into their toroidal and poloidal components in addition to measuring ion temperatures. The third system has views that extend to the plasma centre but is of lower resolution than the edge system. Light from these three systems is analysed in a suite of four spectrometers: two high throughput fixed-wavelength instruments and two lower throughput, tuneable instruments. Data from the edge system is particularly important in studies of L-H transitions and H-mode pedestal performance. The majority of the analysis is done using the carbon charge-exchange feature but since the conversion of JET to a metal-walled machine, carbon levels in the plasma have dropped and so other impurity lines (beryllium, neon, nitrogen) are used on occasion. The diagnostic is equipped with spectral lamps that provide a wavelength calibration after every JET pulse. A sensitivity calibration is carried out during each maintenance shutdown of JET using a white-light source carried robotically around the inside of the tokamak. The present RO for the diagnostic has developed much of the software and hardware of the existing system; he has taken on a new role but will remain closely involved with the diagnostic.

Main responsibilities

1. Operational responsibility for the poloidal charge-exchange diagnostic, with the assistance of the present diagnostic RO. This work includes: calibration and modifications (as and when appropriate) during shutdowns; maintenance and development of software for spectral analysis; wavelength and grating selection to optimise measurements for different JET experiments.
2. To analyse results from the diagnostic and write processed data in response to requests delivered through the JET web-based 'Reqco' system. (These requests come from the Scientific Coordinators running experiments on JET.)
3. To cross-check results of the analysis of the poloidal charge-exchange system against other diagnostics (including: the core charge-exchange system; Thomson scattering electron measurements; Doppler reflectometry flow measurements;

Lithium beam density measurements) and to investigate any discrepancies.

4. Preparation of technical control documents for any engineering changes to the diagnostic hardware in the torus hall and for any computer interface hardware and software (assistance and training will be provided).
5. To report on the status of the diagnostic and analysis, as appropriate, to regular Data Validation meetings. To maintain the status information and diagnostic information in the online JET Diagnostic Handbook.

Special Features

Although the primary role will be linked to the specific diagnostic system, the Spectroscopy Group functions as a team and the secondees may be asked to assist with operation and/or maintenance of other systems for which the group is responsible.

JET experiments run from 06:30 until 22:00, and some control-room shift working will therefore be required to support operations.

Desirable qualifications, aptitudes and experience

1. A broad practical (“hands-on”) knowledge of technologies and techniques relevant to spectroscopy, such as optics, spectrometers: detectors; calibration; alignment, is highly desirable.
2. A good physical sciences degree and postgraduate and preferably post doctoral research experience. Knowledge of atomic and plasma physics would be a significant advantage.
3. Fluency in IDL and familiarity with Linux/UNIX systems would be an advantage.
4. Ability to work within a team and in a regulated safety and QA environment is essential.
5. Knowledge of general tokamak physics will be an advantage.

Notes

1. Participation in the scientific programme is encouraged, through the sending Research Unit.
2. Publications are encouraged, both through the sending Research Unit, and, for some instrumental aspects, through the Operator.
3. There will be no direct staff or financial responsibility.
4. Work on hardware systems must comply with the CCFE safety and quality systems.

General Contact: Neil Conway (Neil.Conway@ccfe.ac.uk), Diagnostics and Technical Support Unit Head

Technical contact: Nick Hawkes (Nick.Hawkes@ccfe.ac.uk), Spectroscopy Group Leader

Applications through the Head of the Research Unit to the NJOC Senior Manager, Tim Jones, by 30th June 2015. Later applications may be considered if the post remains unfilled.

Note that candidates who are not EU nationals will need to obtain a visa to work in the UK. The JET Operator can provide advice on the issues involved and candidates are recommended to investigate before interview