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25 November 2008

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**Thesis Title: Integral-Field Spectroscopy of Seyfert Galaxies: Kinematics and Excitation of Gas in Narrow-line Regions**

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This thesis deals with the subject of the excitation mechanisms and the motion of gas surrounding active galactic nuclei. The study includes new data obtained using the IFU instrument OASIS on the 3.6m CFHT. In addition, a significant element is the application of a computer code that can be used to model specific geometries of the ionised gas, such as; a sphere, disc and cone emission. This code can also deal with projection effects, which previous studies using just emission line maps, were not able to treat effectively because of their lack of information of the third dimension, velocity.

The thesis is well written in English, with only a small number of minor grammatical errors, which do not hinder the understanding of the content in any way. It is presented in a logical fashion, starting in chapter 1 which contains a comprehensive introduction on the current state of our knowledge of the narrow line emitting region of Seyferts. This does not cover their multi-frequency properties, but it is well suited as a framework for the subsequent chapters on the modelling and interpretation of the IFU observations. Chapter 1 ends with a nice summary of various instruments that are used to obtain 3D spectroscopy.

Chapter 2 goes into the details of the modelling code, and the components that may be responsible for the observed properties of the IFU data cubes. The model uses the full information content of the IFU observations, and it is tested against previous observations that used narrow-band filters, and hence did not have the benefit of the additional velocity dimension. This comparison study exposes the limitations of the 2D data. The content of this chapter shows clearly the need to derive self-consistent models for the geometry and the kinematics of the gas.

Chapter 3 is devoted to a description of the data reduction and analysis of IFU spectroscopic data, including how to take account of the stellar component in a simplified form, and the standard models for fitting emission line profiles, and the assumed atomic ratios. It also describes the method of tuning the signal to noise to a selected value across the data-cube.

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Chapter 4 is the core of the thesis in terms of the scientific results. The results for the Seyfert 2s have recently been accepted for publication in Journal of Astronomy and Astrophysics. Additional analysis and interpretation of observations of Seyfert 1s are described in this chapter. There are many interesting and important findings from this work, for example; the radial changes in the excitation of the gas, which is important for understanding of the ionisation processes eg. from the nucleus, or in-situ processes. Signatures of non-axisymmetric rotation appear to be quite common in Seyfert 2 galaxies, and multi-component emission line profiles are present in almost all cases. It is found that selective absorption (dust reddening) needs to be incorporated into the emission line models. The role of the stellar component is also considered, although the IFU data only cannot fully constrain all of its properties. Chapter 5 summaries the results, and outlines some future prospects.

In conclusion, this is an impressive study using 3D modelling of AGN. The contribution of this work to our knowledge of the gaseous content and, to some degree, the stellar content, is significant. The thesis demonstrates to me that the candidate has achieved a high level of understanding of the subject in many respects, including the technical aspects of IFU data reduction and modelling, as well as the interpretation and conclusions that can be derived. I have acted as external examiner for over 20 PhD theses, mostly in the UK and France, and this example ranks in the top 1/4 of those that I have examined. In my opinion this work clearly merits the award of a Doctorate degree.

Yours sincerely

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