HIGH VELOCITY IONIZED GAS NEAR IRS 16

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1. INTRODUCTION

An important means of studying the unusual activity within the central ~0.15 parsec of the galaxy is to obtain detailed information on the high velocity ionized gas there. This gas was first reported by Hall, Kleinmann, and Scoville (1982), who observed the He I line at 2.06 μm. Subsequent observations of this line and the Br α and Br β lines of H I (4.05 μm and 2.17 μm, respectively) by Geballe et al. (1984, 1987) have defined the coarse spatial and spectral properties more accurately. Briefly, the broad (i.e., |v| > 400 km/s) line emission, as observed at velocity resolutions as high as 400 km/s and angular resolutions as high as 2.5" (1) extends approximately to +/- 700 km/s (e.g., see Fig. 1), (2) is spatially resolved, with a characteristic dimension of 3", (3) is centered approximately on IRS 16C, and (4) appears to be due neither to

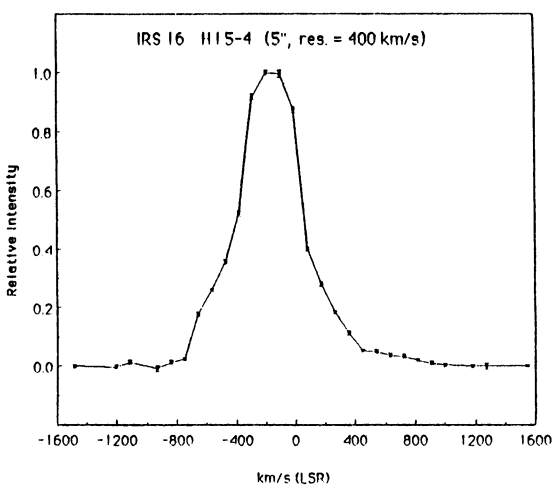

Fig. 1 - A low resolution spectrum of the Br α line at IRS 16, obtained at UKIRT in 1985. A linear continuum has been subtracted from the original spectrum. Note the broad wings, which indicate that the intrinsic emission extends to about +/- 700 km/s.

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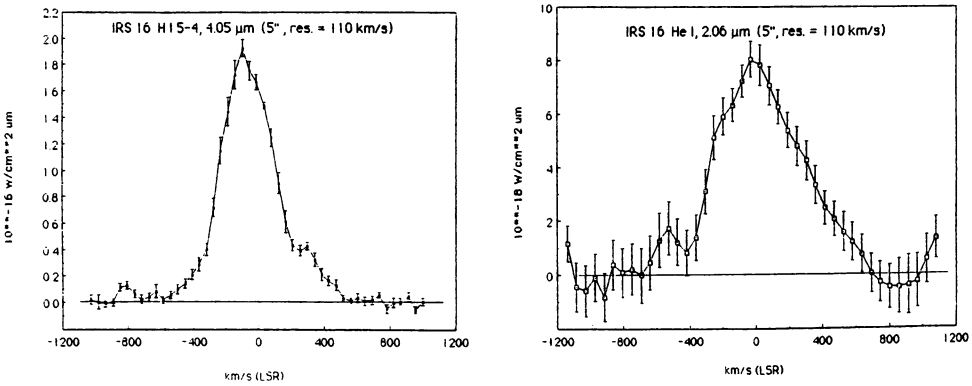
rotational motion nor to a simple radial flow from or onto a single compact object. These properties are difficult to understand in terms of simple models, and point out the necessity for further measurements at higher spectral and spatial resolutions.

2. SUMMARY OF RECENT WORK

We recently began a program to measure high resolution profiles of the He I and H I lines and to obtain detailed images of the very high velocity ionized gas. This work is being done at UKIRT using various Fabry-Perot interferometers in series with the facility cooled grating and CVF spectrometers and the infrared camera. Figures 2 and 3 show our initial results: spectra at ~110 km/s resolution of the Br α and He I lines in 5" beams centered on IRS 16C. In Fig. 2, note that the wings of the line appear to extend to +/- 700 km/s and the possible presence of a discrete feature at -800 km/s. In Fig. 3, note the similar FWZI and that the He I line is considerably fatter than the Br α line. Explanations for this difference are discussed in Geballe et al. (1984).



Figs. 2 and 3 - High resolution spectra of the Brα and He I lines at IRS 16, obtained in May and June, 1988. Linear continua have been subtracted from each original spectrum.

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