

## Brackett Gamma Imaging of the Nucleus of M83

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The gas-rich nucleus of barred spiral galaxy, M83, is a hotbed of star formation, with a total infrared luminosity of  $4 \times 10^9 L_{\odot}$ . We have observed the nucleus of M83 with the near infrared spectrometer, NIRSPEC, on Keck 2 to obtain high resolution Br $\gamma$  recombination line spectra of the nucleus. Simultaneous imaging with the SCAM camera in a broadband K filter shows the position of the slit on the near-infrared galaxy. This allows us to map the nucleus with a continuum reference. The SCAM image shows a bright peak at the nucleus and a complex semi-circular arc of emission to the southwest. We stepped the  $0.5'' \times 24''$  length slit in small declination increments to map a  $20'' \times 20''$  region just west of the nucleus. Individual spectra were used to form a ra-dec-lambda cube and an integrated intensity map of Br $\gamma$ .

A total of  $1.1 \times 10^{-16} \text{ W m}^{-2}$  of Br $\gamma$  emission is detected in the map, in good agreement with previous low resolution observations (Turner, Ho, & Beck 1987, ApJ, 313, 644). This is not corrected for extinction within the molecular clouds in M83 or to the nebulae themselves and is therefore a lower limit to the true Br $\gamma$  flux. Extinction is estimated to be at least a magnitude in the near-IR as measured in larger ( $4''$ ) beams (Turner et al.) The bulk of the Br $\gamma$  emission extends along the northern portion of the near-IR continuum semi-circle. Twenty percent of the total Br $\gamma$  emission comes from single a  $3''$  (FWHM) source located  $5''$  west of the near-IR nucleus.

The complementary NIRSPEC Br $\alpha$  data we have obtained will eventually allow us to evaluate the near-IR extinction on subarcsecond sizescales and obtain an extinction-corrected estimate of the Lyman continuum rate and therefore the number of ionizing stars.

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