

## Spectrum of a Red, Lensed Quasar

The figure below is a spectrum of the red, lensed quasar FTM 0134-0931 ( $z = 2.2$ ) obtained with the medium-resolution spectrograph and imager, SpeX, on IRTF in 2001 September, by Michael Gregg and Mark Lacy. Upper line: the bright infrared component (consisting of radio components A-E). Lower line: the faint infrared component (radio components D and F). The strong emission line at  $2.1\mu\text{m}$  is  $\text{H}\alpha$ . See Gregg et al. astro-ph/0107441 for details of the lensed image configuration, photometric data and the optical spectrum. The spectrum of the bright component below  $1\mu\text{m}$  on this figure is from the ESI spectrograph on Keck.

This spectrum is the first in which the two infrared components, which are separated by 0.7 arcsec, have been resolved, and their similarity proves that the quasar is lensed. The lensing is caused by a massive object between the quasar and the telescope bending light by gravity to form multiple images. Studying the ratio of the two components as a function of wavelength will enable us to measure any differential reddening between them, and will thereby allow us to determine whether the exceptional redness of this quasar is predominately due to dust absorption in the lens, or dust absorption in the environment local to the quasar.

The implication of this work is to improve lensing statistics to investigate the values of cosmological parameters. The number of lenses is very sensitive to the of "dark energy" in the Universe.

