

The unique combination of mm interferometry and near infrared adaptive optics has enabled us to construct a dynamical model of the central kpc of NGC7469, revealing a sub-arcsec ring, inside which is a young compact star forming region with a luminosity 20% that of the AGN.

High-resolution mm data from the IRAM interferometer and near-infrared adaptive optics data from the Keck II telescope, has provided a tool to probe the distribution and dynamical structure of the stars and gas in NGC 7469 across 2 orders of magnitude in spatial scale. The kinematics of the mm CO 2-1 and K-band H<sub>2</sub> 1-0S(1) lines can be reproduced at their different resolutions by a single axisymmetric mass model comprising 3 components: a broad disk, a circumnuclear ring with radius 2-2.5'', and a nuclear ring with a radius of 0.2'' (65 pc). From the dynamical mass and estimates of the stellar mass, we find that the CO-to-H<sub>2</sub> conversion factor is 0.4-0.8 times that for the Milky Way, following the trend to small factors seen in intense star-forming environments. While the gas dominates the mass on scales of several arcsec, in the central 0.2'' most of the mass is due to stars. This nuclear star cluster has a FWHM of 0.15-0.2'' (50 pc) and lies inside the nuclear gas ring. Constraints from the dynamical mass and K-band stellar light indicate that its age is < 60 Myr and it contributes ~10% of the galaxy's bolometric luminosity.

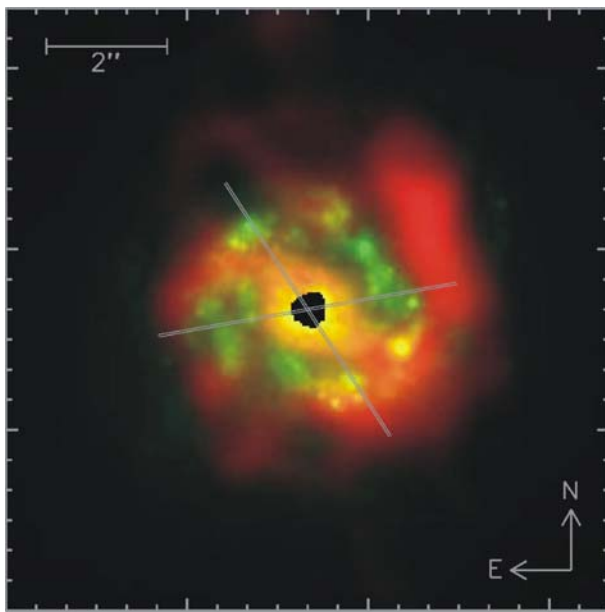
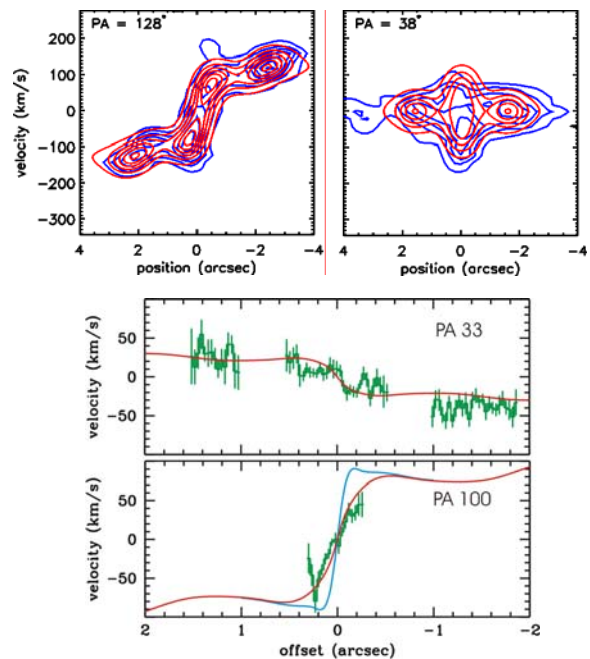


Image showing the molecular gas, as traced by our CO2-1 data (red) and the stellar continuum (J-band HST NICMOS data, green). Yellow regions indicate the presence of both. The nucleus has been masked out. The 37mas wide long slits we used for the adaptive optics spectroscopy are shown.



Top: position-velocity maps of the CO2-1 data for 2 position angles (blue) with our dynamical model (red) superimposed.

Bottom: the rotation curves for the 1-0S(1) line (green). The same dynamical model (but at the much higher spatial resolution; red) is superimposed. The blue curve in the lower panel indicates how the rotation curve would appear if there were a large unresolved mass.

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