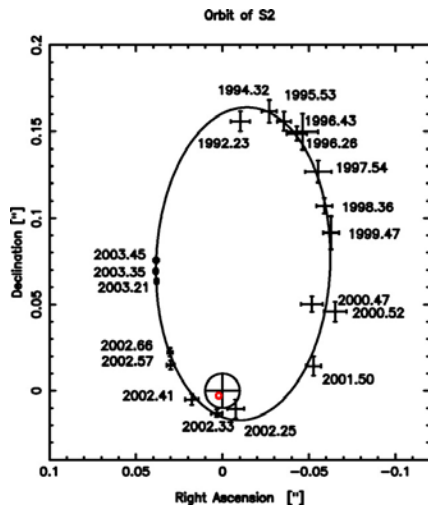
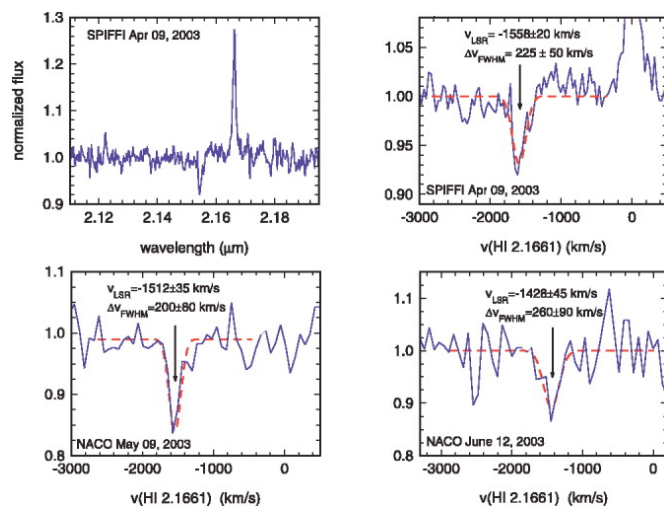


The distance to the Galactic center (R_0) is a fundamental parameter for determining the structure of the Milky Way. We report here the first primary distance measurement to the Galactic center with an uncertainty of only 5%.

Through its impact on the calibration of standard candles, such as RR Lyrae stars, Cepheids, and giants, the Galactic center distance holds an important role in establishing the extragalactic distance scale. This determination has become possible through the advent of precision measurements of proper motions and line-of-sight velocities of the star S2. This star is orbiting the massive black hole and compact radio source Sgr A* that is located precisely at the center of the Milky Way. The essence of the method is that the star's line-of-sight motion is measured via the Doppler shift of its spectral features in terms of an absolute velocity, whereas its proper motion is measured in terms of an angular velocity. The orbital solution ties the angular and absolute velocities, thereby yielding the distance to the binary.



H I Br absorption spectra of S2, obtained on 2003 April 8/9 with SPIFFI (upper two panels), on May 8/9 (lower left panel), and on June 11/12 (lower right panel) with NACO at the VLT. The SPIFFI spectrum is sky-subtracted and in a 0.1×0.2 aperture; the NACO spectrum is slit-nodded and in a 0.086×0.1 aperture. These differences account for the fact that the minispiral emission features between -400 and $+400$ km s⁻¹ LSR are visible in the SPIFFI data but not in the NACO spectrum.



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