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The interaction of the outflow with the molecular disk in the Active Galactic Nucleus of NGC 6951

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Abstract. Context: we present a study of the central 200 pc of NGC 6951, in the optical and NIR, taken with the Gemini North Telescope integral field spectrographs, with resolution of $\sim 0''.1$ Methods: we used a set of image processing techniques, as the filtering of high spatial and spectral frequencies, Richardson-Lucy deconvolution and PCA Tomography (Steiner *et al.* 2009) to map the distribution and kinematics of the emission lines. Results: we found a thick molecular disk, with the ionization cone highly misaligned.

Keywords. galaxies: individual (NGC 6951)

1. Introduction

NGC 6951 hosts a Seyfert 2 nucleus, and it is at a distance of 24.1 Mpc ($1'' = 117$ pc), with and inclination of $i = 46°$. It has a radio compact nuclear component, with a position angle of 156°. The HST/ACS image of the ionized gas shows a central elongated structure seen in Hα+[N II], with a similar PA. The orientation of the jets in AGNs and the galaxy disk/torus are uncorrelated, and its non-detection suggests that it is confined in a small region because of its large misalignment and interaction with the ISM.

2. Results and conclusions

If we overlap the images for the ionized gas from the HST and the average image of the H_2 molecular lines, we see that the outflow is misaligned with respect the molecular gas, suggesting some kind of interaction. The new detected molecular structure is an edge-on disk of H_2, with radius of ∼47 pc and ∼10 pc of thickness and PA = 124°. The radial velocity range is -40 to +40 km s^{-1}, with velocity dispersion of 40 ± 4 km s^{-1}.

The H_2 has a larger velocity dispersion in the direction of the ionization cone, likely associated with the turbulence induced by the radio jet. Based on the H_2 line ratios, we conclude the excitation mechanism is mainly due to shocks. This is explained as a ″digging process″ that the jet inflicts on the disk, ejecting some of the molecular gas.

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Reference

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