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The deeply obscured AGN of NGC4945 I. Spitzer-IRS maps of [Ne V], [Ne II], H2 0-0 S(1), S(2), and other tracers

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The nearly edge-on galaxy NGC4945 is one of the closest galaxies where an AGN and starburst coexist, and is one of the brightest sources at 100 keV. Near and mid-infrared spectroscopy have shown very strong obscuration of its central region, rivaled only in strength by some of the most deeply obscured ULIRGs. We aim to determine the spatial distribution of ISM features in the central 426x426 pc^2 of NGC4945. We map the central region of NGC4945 in three Spitzer-IRS modules (SH, SL and LL). We produce maps of the flux distribution of the starburst tracers [Ne II], [Ne III], [S III] and [S IV] at 12.81, 15.56, 18.71 and 10.51 mum, respectively, and a map of the AGN narrow-line region tracer [Ne V] at 14.32 mum. We also mapped the S(1), S(2) and S(3) pure rotational lines of H2, which trace the distribution of warm molecular hydrogen. We obtained an extinction map (A_V) based on the apparent strength of the 9.7 mum silicate absorption feature. Our A_V map traces the contours of the starburst ring but the highest extinction (A_V(9.85 mum)~60) is found at the nucleus. Within the uncertainty of the astrometry all emission lines are found to peak on the nucleus, except for the warm molecular hydrogen emission which shows a maximum 60-100 pc NW of the nucleus. We favour a scenario in which the lower H2 0-0 S(1) and S(2) rotational lines originate mainly from an unobscured extra-nuclear component associated with the super-wind cone observed in the HST NICMOS map of the H2 1-0 S(1) vibrational line. For the [Ne V] emission we infer an attenuation of a factor 12-160 (A_V=55-112) based on a comparison of the ratio of our [Ne V] flux and the absorption-corrected 14-195 keV Swift-BAT flux to the average [Ne V]/BAT ratio for Seyfert 1 nuclei. The high attenuation indicates that [Ne V] and [O IV] cannot be used as extinction-free tracers of AGN power in galaxies with deeply buried nuclei.

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