Interaction between the Northeastern Boundary of Sgr A East and Giant Molecular Clouds

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We have detected the v = 1 → 0 S(1) (λ = 2.1218 ㎛) and v = 2 → 1 S(1) (λ = 2.2477 ㎛) lines of H2 in the Galactic centre, in a 90 × 27 arcsec region between the northeastern boundary of the non-thermal source, Sgr A East, and the giant molecular cloud (GMC) M-0.02-0.07. The detected H2 v = 1 → 0 S(1) emission has an intensity of 1.6 -- 21 × 10-18 W m-2 arcsec-2 and is present over most of the region. Along with the high intensity, the broad line widths (FWHM = 40 -- 70 km s-1) and the H2 v = 2 → 1 S(1) to v = 1 → 0 S(1) line ratios (0.3 -- 0.5) can be best explained by a combination of C-type shocks and fluorescence. The detection of shocked H2 is clear evidence that Sgr A East is driving material into the surrounding adjacent cool molecular gas. The H2 emission lines have two velocity components at ~ +50 km s-1 and ~ 0 km s-1, which are also present in the NH3(3,3) emission mapped by McGary, Coil, & Ho (2001, ApJ, 559, 326). This two-velocity structure can be explained if Sgr A East is driving C-type shocks into both the background GMC M-0.02-0.07 and the northern ridge of McGary, Coil, & Ho (2001).