Q03a ALMA reveals a hub of filamentary molecular clouds in Sgr B2(N)

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We present $C^{18}O$ (1–0) images of Sgr B2(N), a region of massive star formation, by analyzing the archival ALMA data used by Higuchi et al. (2015, ApJ 815, 106). The synthesized beam is 1.6" × 1.2" (0.06 pc × 0.05 pc at the distance of 7.8 kpc). The massive dense core of Sgr B2(N) is resolved into a hub of filamentary molecular clouds. The typical width and column density of the filaments are 0.08 pc and 5×10^{22} cm^{-2}, respectively (beamwidth uncorrected), which correspond to the typical line mass of 60 $M_\odot$/pc for the filaments (assuming optically thin $C^{18}O$ (1–0) emission at $T_{ex} = 50$ K, $[C^{18}O]/[H_2] = 1 \times 10^{-7}$). The hub is centered at the position of the compact continuum source K2, the center of the system of a rotating core and a massive bipolar outflow reported by Higuchi et al. (2015). The filaments exhibit the general velocity gradient from east to west consistent with the steep velocity structure noted by Hasegawa et al. (1994, ApJL 429, L77) as evidence of a cloud collision. We discuss possible formation mechanisms of the massive dense core with the observed filamentary structure.