P117a ALMA reveals a hub of filamentary molecular clouds in Sgr B2(N) II

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High-mass young stellar objects are usually deeply embedded in their parental dense and massive molecular clumps, obscuring their early formative stages. Their formation timescales of $\sim 10^5$ yr are short, and they form in distant clusters and associations. All these factors limit our understanding of their formation processes. High angular resolution observations are indispensable in the efforts to unveil the mystery of high-mass star formation. ALMA provides the high sensitivity, angular resolution, and dynamic range to improve our understanding of the formation processes of high-mass stars and their parental clumps.

We present the results of $C^{18}O(J=1–0)$ line observations of Sgr B2(N) made with ALMA at an angular resolution of $\sim 2''$. From our analysis, 10 filaments within the $C^{18}O$ emission are identified and that 50% of flux in the $16''$ beam of the Nobeyama 45-m telescope is reproduced. A hub of $\sim$10 filaments centered at the massive-star forming hot core at K2. Filaments have the typical 0.1 pc diameter, but with relatively large line mass of $\sim 10^2$ $M_\odot$/pc. SE-NW filaments may be a result of interaction with the massive bipolar outflow. The other filaments may have formed in a sheet with large velocity sheer at the cloud collision interface. The total filament mass ($\sim 10^3$ $M_\odot$) is small compared with that of the core ($>10^4$ $M_\odot$). We will discuss the physical condition of high-mass star formation in Sgr B2(N) based on the ALMA data.