

Case for Band 1 with respect to the galactic center.

This band is sensitive to both ionized thermal gas, nonthermal synchrotron emission (flat spectrum) as well as a number of spectral lines including the brightest class I methanol maser and SiO line. Research in the Galactic center will suffer more than any complex region in the southern hemisphere if Band 1 is not installed. Here are three simple reasons that highlights the advantages of using Band 1 toward the complex region of the Galactic center.

ALMA will allow for the first time to obtain uv coverage of a southern source resulting to an unprecedented sensitivity to detect weak features with a wide range of angular scales. The Galactic center is well known to have a wide range of angular scales from 37 microarcseconds (Sgr A*) to the degree-scale structure (The Galactic Center Lobe). It is also known that the lack of uniform uv coverage is a source of noise for even bright sources when using the VLA and ATCA. For example, there is a large population of mass-losing ionized stellar sources in the Galactic center region and yet radio continuum emission from these sources 7mm has not been detected due to the high background resulting from sidelobes of bright extended sources.

Another problem is the issue of synchrotron emission at 7mm. Many of large-scale nonthermal filaments in the Galactic center region shown to have flat spectrum so they should be easily detected at 7mm. However, the degree of polarization is completely inaccurate when using the VLA. The lack of uniform coverage affects the Stokes I (which is extended) more than the Stokes Q and U. As a result, the degree of polarization is measured to be greater 100% or negative. This artifact could affect the polarization of any extended nonthermal source in the south.

The brightest methanol line that is collisionally excited is at 44 GHz. These masers show signposts of massive star formation and the central molecular zone of the Galactic center is a great target for sites of massive star formation through 44GHz masers lines. One should not make the same mistake of not installing the 6.7GHz receivers on the GBT.