Poster: Chemistry within the Central Molecular Zone

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The inner few hundred parsecs of the Milky Way, the Central Molecular Zone (CMZ), contains a large reservoir of molecular gas clouds with densities and temperatures much larger than typically observed in nearby galaxies and within the disk of our own galaxy. By studying the gas properties and chemistry of these clouds one can begin to get an idea of the complex chemistry associated with such protostellar cores and begin to determine important physical properties of these clouds (such as temperature and mass). While the overall properties of the CMZ are extreme, there are significant variations within the region itself. Comparing the chemistry of the clouds that surround Sagitarrius A* at a distance of roughly ∼10 pc with clouds at larger galactic longitudes (such as Sagitarrius B2 and the 1.6 degree cloud) which lie at a distance of 100s of pc from Sagitarrius A*, we can begin to understand the extent to which this chemistry depends on environment. with specific interest in CH3CN, which traces the chemistry within hot cores; SiO, which traces shocks, and H2CO, which can be used to characterise the physical properties via turbulent line widths and gas temperatures. Typically, complex molecules such as CH3CN and H2CO form on the surface of dust within dense core, so it is expected that these tracers are only found within such dense cores (where dense here refers to 10^4 cm^{-3}), however as most of the gas within the CMZ exceeds this density, these complex molecules are found throughout the region. The dust itself usually contains silicates locked up in solid form, these silicates are then only seen once a shock can destroy the dust, allowing for SiO to form in the gas phase; but again, SiO is found throughout the CMZ. The reason for the presence of these molecules throughout the region is still quite a mystery, and as such a study of how the chemical composition of the cores changes throughout the region will help begin to answer such a question. Using the SMA we have obtained a vast amount of data of all clouds exceeding an H2 density of 10^{23} cm^{-2} with a spatial resolution of $4''$ which can begin to help us probe these mysteries in detail.

Molecular Clouds