these sources coincide with infrared identified stellar sources associated with the central cluster. We used the accurate position of radio stars to register the radio and infrared frames at a smaller angular distance from Sgr A* (~5") than had been made in earlier studies based on SiO masers (Menten et al. 1997; Reid et al, 2003). Sensitive radio measurements should be able to potentially discover highly extincted stellar sources that are not detected at near-IR wavelengths. We discuss the origin of radio emission from stars in the central cluster. We also present dark features in Galactic Center radio images that are the imprints of envelopes of dusty stars and molecular clouds.

214.04 – A Census of Diverse Environments in Infrared Dark Clouds: Where Do Massive Stars Form?

William J. Dirienzo[1], Crystal L. Brogan[2], Remy Indebetouw[1, 2], Claire J. Chandler[3], Kathryn E. Devine[4]

1. University of Virginia, Charlottesville, VA, United States. 2. National Radio Astronomy Observatory, Charlottesville, VA, United States. 3. National Radio Astronomy Observatory, Socorro, NM, United States. 4. The College of Idaho, Caldwell, ID, United States.

Infrared Dark Clouds (IRDCs) harbor the earliest phases of massive star formation and complex astrochemistry. IRDCs are extraordinarily dense and cold objects of dust and molecular gas arranged in filamentary or globule structures with compact cores. Many of the compact molecular and millimeter cores are known to host massive protostars from a variety of star formation indicators. We have used the GBT and the VLA to map ammonia and CCS in nine IRDCs to reveal the temperature, density, and velocity structures and explore chemical evolution in the dense cores. Ammonia is an ideal molecular tracer for these environments as its critical density is appropriate for IRDCs, and nitrogen-bearing species are not prone to dust-grain freeze-out even in these cold regions. The hyperfine structure allows unambiguous determination of the optical depth and thus the column density, and using two rotational transitions allows determination of the temperature. By imaging ammonia and CCS in these regions, we can use their abundance ratios as “chemical clocks” to determine whether the starless cores are indeed less evolved. With this data we will begin to address the questions of how these two classes of cores are alike and different and whether the quiescent cores are likely to eventually form stars or not. We further investigate the structure and kinematics of the IRDCs, revealing gradients and colliding sub-clouds that elucidate the formation process of these structures and their protostars. A comprehensive study of IRDCs in molecular gas tracers with both total power and high resolution is necessary to truly understand the relationship between IRDCs and massive star formation.

214.05 – Kinematics and Temperature Structures of Filaments in Serpens Main and Serpens South

Katherine Lee[1], Lee G. Mundy[1], Manuel Fernandez Lopez[2], Shaye Storm[1], Leslie Looney[2], Dominique Segura-Cox[1], Peter J. Teuben[1], Erik Rosolowsky[3], Hector G. Arce[4], Yancy L. Shirley[5], Adele Plunkett[4], Andrea Isella[6], John J. Tobin[7]

1. University of Maryland, College Park, MD, United States. 2. University of Illinois at Urbana-Champaign, Urbana-Champaign, IL, United States. 3. University of Alberta, Edmonton, AB, Canada. 4. Yale University , New Haven, CT, United States. 5. University of Arizona, Tucson, AZ, United States. 6. Caltech, Pasadena, CA, United States. 7. NRAO, Charlotteville, VA, United States.

We present a study of filaments in Serpens Main and Serpens South cluster regions based on N2H+(1-0) observations from the CARMA Large Area Star-formation Survey (CLASSy) and dust continuum images from the Herschel Space Observatory. Serpens Main and Serpens South are active star formation regions with prominent filamentary structures; however, the role of the filaments in the cluster formation is unclear. This study of filament structure and kinematics with high-angular resolution data (7 arcsecs), particularly in revealing possible infall signatures, provides physical insight to this question. Using the Herschel data, we estimate the temperature in and along filaments for comparison with their gas kinematics, spatial distribution, and N2H+(1-0) emission, to better understand their role in current star formation activities.

214.06 – Dendrogram Analysis of Large-Area CARMA Images in Perseus: the Dense Gas in NGC 1333, Barnard 1, and L1451

Shaye Storm[1], Lee G. Mundy[1], Peter J. Teuben[1], Katherine Lee[1], Leslie Looney[2], Manuel Fernandez Lopez[2], Erik Rosolowsky[3], Hector G. Arce[4], Yancy L. Shirley[5], Dominique Segura-Cox[2], Andrea Isella[6]

1. University of Maryland, College Park, MD, United States. 2. University of Illinois, Urbana-Champaign, IL, United States. 3. University of Alberta, Edmonton, AB, Canada. 4. Yale, New Haven, CT, United States. 5. University of Arizona, Tucson, AZ, United States. 6. Caltech, Pasadena, CA, United States.