

A multi-phase and multi-scale view of the ISM in the Carina Nebula

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The Carina Nebula Complex (CNC) is a spectacular star-forming region located at a distance of 2.3 kpc (Smith & Brooks 2008), which is close enough to observe a wide range of size scales in detail. With more than 65 O-stars and more than 900 young stellar objects identified (Smith et al. 2010), it is also the nearest analogue of more extreme star forming regions, such as 30 Doradus in the Large Magellanic Cloud. I will present the latest results of a major effort to study the relationship between the neutral, ionized and molecular gas phases of the ISM in the Carina region using the Australia Telescope Compact Array (ATCA), the Mopra telescope and ALMA. The Mopra CO images, combined with far-infrared data from Herschel, have allowed us to determine the overall molecular mass and its distribution across the CNC (Rebolledo et al. 2016). Detection of HI self-absorption features has revealed the presence of cold neutral gas, signalling the phase transition between atomic and molecular gas (Rebolledo et al. 2017). I will also present high-quality images of the radio continuum at 2.0 GHz obtained with ATCA, which can then be compared with the structures seen in atomic and molecular gas maps. Finally, I will present the latest results of a ALMA campaign to study the effect of massive star feedback on the location, mass, and kinematics of the small-scale fragments within massive star-forming clumps in two distinctive regions of the CNC using important diagnostic lines of the abundant molecular species such as HCO, HCN, HCO⁺ and C₂H.

Molecular Clouds