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Star Formation in Extreme Environments: The Case of the Prototypical Blue Compact Dwarf Galaxy II Zw 40

With their high star formation rate surface densities and low metallicities, blue compact dwarf galaxies represent one of the most extreme environments for star formation in the local universe: one more akin to that found in high redshift galaxies than in local spirals. Until the advent of ALMA, however, the molecular gas fueling the prodigious star formation in blue compact dwarfs was difficult to observe because these galaxies generally have weak CO emission. In this talk, I present the first detailed study of the dust and molecular gas content (as traced by CO) in the prototypical nearby blue compact dwarf galaxy II Zw 40. Using the extraordinary resolution and sensitivity of our ALMA Cycle 1 observations, we have separated the molecular gas emission into discrete GMC-sized clumps and measured their properties. Surprisingly, we find that -- aside from their low CO luminosities -- the giant molecular clouds in this extreme galaxy have similar properties to clouds in normal spiral galaxies. This discovery suggests that giant molecular clouds share a set of universal properties, despite the differences in their surrounding galactic environment. Finally, we explore the evolution of the giant molecular clouds within II Zw 40 and suggest that the observed clouds include a range of evolutionary states, which provides us with important clues about the eventual fate of II Zw 40. Finally, we also report on some of the first observations of dense molecular gas tracers in a Local Group blue compact dwarf, giving a first look at the internal structure of the molecular gas in these extreme galaxies.