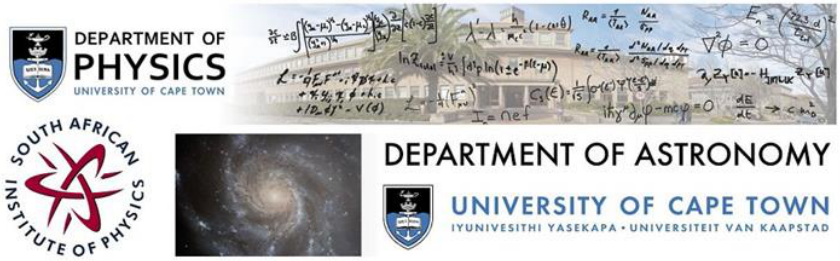

Contribution ID: **427** Type: **Oral Presentation**

Studying the Star formation - Neutral gas relation in WHISP Galaxies

Tuesday, 5 July 2016 11:50 (20 minutes)

Abstract content
   (Max 300 words)
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I present a study of the Kennicutt-Schmidt (KS) relation for star formation and neutral hydrogen gas (HI) in a sample of galaxies drawn from the Westerbok HI Survey of Spiral and Irregular galaxies (WHISP). 21cm HI data were used to derive the neutral gas properties while WISE (Wide-field Infrared Survey Explorer) infrared data were used to derive the star formation properties, hence availing us with two uniform data sets. The SFR was found to be tightly correlated with the HI mass with a logarithmic slope of 1.51 which compares favourably to a slope of 1.5 from a similar study of ALFALFA dwarf galaxies by Huang et al (2012). On investigating the surface densities, we find that the atomic gas density does not trace the SFR density probably due to the fact that despite spanning 5 orders of magnitude in HI mass, our sample spans ~ 1 order of magnitude in gas density, a range too narrow for a conclusive argument on the relation. However, this range falls in the region between 3 – 10Mpc−2 (0.5-1 in log space), where Bigiel et al (2008) also found no correlation between SFR and gas densities, but rather found a steep change in the star formation efficiency from lower (HI-dominated ISM) to higher (H2-dominated ISM) gas densities with a saturation point for atomic gas density at 9Mpc−2 , in line with the findings of Wong and Blitz(2002).
Our results thus confirm results from earlier studies that much as the rate of star formation is a function of the mass of neutral atomic hydrogen in a galaxy, the surface density of the HI is not a good tracer of the star formation rate.

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Session Classification: Astrophysics (1)

Track Classification: Track D1 - Astrophysics