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How atomic hydrogen fuels star formation: new results from the WALLABY survey

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Neutral atomic hydrogen (HI) is a key component of the cold gas reservoir that fuels star formation in galaxies. However, global HI scaling relations often show significant scatter, partly because HI typically extends well beyond the stellar discs where most star formation occurs. A major limitation in resolving this connection has been the lack of spatially resolved HI data for large galaxy samples—until now. The WALLABY survey, conducted with the Australian SKA Pathfinder, is addressing this gap by delivering (at least marginally-) resolved HI observations for thousands of nearby galaxies. In this talk, I will present the first measurements of HI mass enclosed within the stellar-dominated regions of ~ 1000 gas-rich galaxies from WALLABY. I will discuss how constraining HI to the stellar disc affects key scaling relations, focusing on the fraction of HI mass within the disc, average HI surface density, and HI depletion time. The inner HI mass fraction varies widely among galaxies, and this variation is strongly correlated with star formation-related properties. In particular, the average HI surface density within the stellar disc emerges as a key predictor of star formation activity. These results demonstrate the critical role of resolved HI data in uncovering the physical drivers of galaxy evolution.

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