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The Galactic ISM in the SKA Era: Focus on the GASKAP Survey

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The interstellar medium is the lifeblood of galaxies, providing the raw material from which stars are born, and to which they return much of their matter when they die. Some of the biggest unknowns in galaxy evolution are tied to the detailed physics of the ISM: e.g. the multiple phase transitions needed to convert warm HI into star-forming gas, the role of feedback in regulating star formation, and the inflow/outflow of matter from galaxy disks. Detailed understanding of these processes requires that we study the ISM at high resolution, in our astrophysical "back yard". This is the aim of the Galactic ASKAP survey (GASKAP). GASKAP is observing the HI 21cm line and the four OH 18-cm lines, in both emission and absorption, throughout the Milky Way and Magellanic System, at unprecedented resolution and sensitivity. In this talk I will present science results from the GASKAP HI pilot fields that have revealed the unusual properties of the cool atomic gas in the far outer Milky Way, and provided the most detailed picture of the HI in the SMC to-date. I will then outline how OH will be used to measure the physical state of the molecular gas en-route to star formation (including diffuse CO-dark gas bridging the gap between cold HI and fully molecular clouds), quantify stellar feedback from HII regions, and reveal new sites of star-formation in the Milky Way. I will end by looking forward to the prospects for Galactic ISM science with SKA-Mid.

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