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Abstract:

Magnetic fields play an important role in various physical scales from Galactic spiral arms down to star-forming clouds and cores. Extremely long giant molecular clouds tracing the densest parts of spiral arms, a.k.a. the “bones” of Milky Way, bridge massive star formation activities in giant molecular filaments and spiral arms. Therefore, measuring magnetic field strengths and study the energy balance of the bones are critically important for a full understanding of massive star formation. Zeeman effect, as the only direct probe of field strength, is the “golden standard” in observing interstellar magnetic fields. Motivated by the first FAST Zeeman measurements using HI self-absorption, and our recent discoveries of extraordinary HI self-absorption (HISA) signatures in two bones, we propose to carry out Zeeman measurements to representative positions in the two bones. Our team is experienced in analysis of both Zeeman and HISA observations. The data will be a key part of a PhD thesis supervised by the PI.