

# High resolution HI observation on Criss Cross Nebula: the case study for shock-cloud interaction

## Abstract

We propose to map the Criss Cross Nebula (CCN) with Meerkat by a total of 7.5 hours (6h on-source). CCN is a unique and rare object for studies of the interaction between shocks and interstellar medium, for its small distance ( $<400\text{pc}$ ), cross-like morphology, low shock velocity ( $\sim 40\text{km/s}$ ), and possible link with the Orion-Eridanus superbubble. Integral-field spectroscopy (IFS) of a small part of the CCN from MaNGA and narrow-band images of [O III] and H $\alpha$  reveal a shock whose direction is opposite to the overall curvature of the nebula. It's likely that the CCN is a shocked cloud, thus the overall curvature shows the morphology of this cloud but not the shock direction. To test this conjecture and to study the micro-structure of the shocked region in detail, one needs to map the whole CCN with spatial resolutions of about  $5''$  according to the MaNGA data. Thanks to its short distance, the whole CCN and a plausible shock precursor nearby can be covered by the FoV of Meerkat, with a high resolution of  $\sim 0.02\text{ pc}$  ( $7''$ ). Two parallel proposals have been approved to obtain IFS with SIELLE on CFHT and CO observation with the PMO submillimeter telescope, both covering the whole CCN. The Meerkat observation would play a key role in this combined effort. With these data we will also be able to test existing shock models, deepen our understanding of shocks and star formation feedback in general, and improve our understanding of the sub-grid models for large scale galaxy simulations.