

FAST Proposal Coverpage

Last updated: 02/28/2019

Project Name:

(A 1-line title for your project)

Large-Scale Mapping of Carbon Radio Recombination Lines Towards Orion-A

Project Summary:

(A 1 paragraph summary of your project, including its scientific goals and how you will address them. This information will be potentially public.)

Carbon radio recombination lines (RRLs) have provided crucial information to understanding the interface (the photodissociation region, PDR) between discrete HII regions and their host molecular clouds. Mapping different layers with appropriate respective tracers is the best way to diagnose the dynamics and evolution of the star-forming environments. Carbon RRLs trace the partially ionized layer, but are difficult to detect because of both its weakness and its strong emitting environment in the relevant bands. We propose to perform the first large-scale mapping (110'x44') of carbon RRLs toward Orion-A, one of the nearest active high-mass star formation region. Since the relative weak intensity line emission of carbon RRLs and large mapping area, FAST with 19-beams is the most suitable and also the only equipment feasible for this project. OTF mapping mode is required by setting a suitable rotation angle of the 19-beams to obtain a relatively flat response curve of beams. Two scans will be enough to cover the main region. Total of 9.1 hours is required including 2.1 hours overhead. Here proposed carbon RRLs large-scale mapping will provide crucial information to the partially ionized and shed unique lights into this important massive star forming cloud.