



THE CHINESE UNIVERSITY OF HONG KONG  
*Department of Physics*  
COLLOQUIUM

# The Puzzle of Low Ionization Warm Ionized Gas in Galaxies

by



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*Date: April 7, 2021 (Wednesday)*

*Time: 11:00 a.m. - 12:00 n.n.*

*Join ZOOM Meeting: <https://qrgo.page.link/zeMq3>*



ALL INTERESTED ARE WELCOME

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## Abstract

In galaxies, stars form through gravitational collapse of dense gas clouds. Not all galaxies have the same efficiency at turning baryons into stars. It is proposed that feedback from supernovae and accreting supermassive blackholes suppresses the star formation efficiency in low mass and high mass galaxies, respectively. The detailed physics of how feedback works is still not well understood. An accurate knowledge of all phases of the interstellar medium is critical for understanding the triggering and cessation of star formation and galaxy evolution. Warm ionized gas can be detected with optical emission lines and have been studied for decades. However, there are two classes of widespread optical line-emitting regions for which the ionization mechanisms are still evading us 30 years after their discoveries: low ionization emission-line regions in quiescent galaxies and the diffuse ionized gas in star-forming galaxies. They may hold critical clues to the heating mechanisms of the interstellar medium and its evolution as star formation shuts down. I will discuss the progress we are making on these issues, specifically about their ionization mechanisms and the potential connection between the two phenomena. These investigations are possible due to large spectroscopic surveys of galaxies, such as SDSS-I and SDSS-IV/MaNGA which we ran. Pushing the boundary of our knowledge also requires new observational capabilities. I will describe the design of a new spectrograph and a planned survey to enable detailed studies of star formation feedback and low ionization warm ionized gas.

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