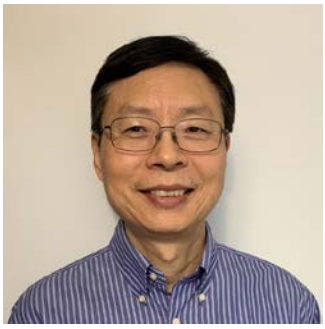
THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

How to Make High-Mass Stars

by



Professor Qizhou ZHANG (張其洲教授)
Center for Astrophysics
Harvard & Smithsonian, USA

Date: February 18, 2022 (Friday)
Time: 9:30 - 10:30 a.m.
Join ZOOM Meeting: https://cuhk.zoom.us/j/99016385610

ALL INTERESTED ARE WELCOME
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Abstract

High-mass stars (>10 Msun) dominate the appearance and the evolution of galaxies. Despite their prominent role in shaping the dynamics and chemistry of the interstellar medium, their birth is poorly understood. In the Milky Way, most high-mass protostars are found in parsec-scale molecular clumps with a cluster of companion stars. Therefore, massive star birth is linked to the collapse and fragmentation of molecular clouds and clustered star formation. The physical conditions (temperature and density) in a molecular clump limit the Jeans mass to about 1 Msun. This creates a barrier for high-mass star formation since dense cores much larger than 1 Msun tend to further fragment into lower mass cores. Once protostars reach 8-10 Msun, the radiation pressure may halt the infall and prohibit stars from further mass growth. As protostars reach more than 15 Msun, significant ionization may disrupt mass accretion once HII regions develop and expand.

In this talk, I will review recent observational efforts that begin to shed light on how molecular clumps collapse and fragment to form high-mass stars and protostellar clusters. I will highlight thermodynamic properties of dense cores that appear to challenge the long held notion of equilibrium star formation. And finally, I will present observational evidence that is critical to the formation of the most massive stars in galaxies.

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