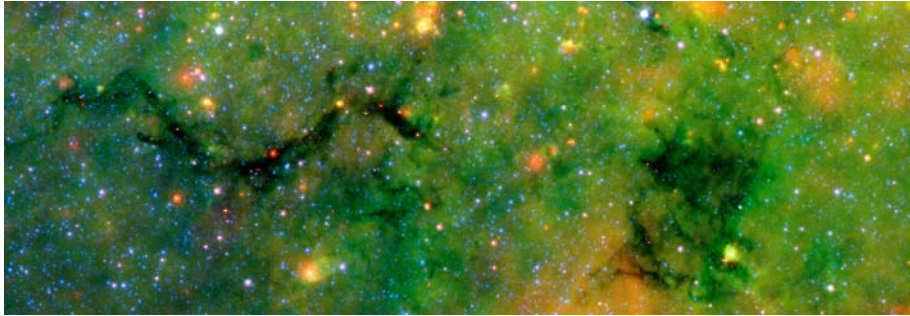


SCSU Physics Department Colloquium



(Image Credit: S. Carey, SSC)



Snakes in the Plane: High-mass Star Formation in Filamentary Infrared Dark Clouds

Dr. James Jackson, Boston University

ABSTRACT. Infrared Dark Clouds (IRDCs) are cold, dense molecular clumps in the interstellar medium. They are identified as dark extinction features in the mid-infrared. We have found that IRDCs contain compact cores which host the early stages of high-mass star formation. Many of these IRDC cores show active signs of star formation. Most IRDC cores however, are quiescent, and show no detectable signs of star formation. We hypothesize that the `quiescent' cores represent the earliest `pre-stellar' core phase, before the development of a warm protostar, and that the `active' cores represent a later `hot core' phase, after the development of a protostar. We test this idea by comparing the sizes, densities, and maser activity between the `active' and `quiescent' cores, and find that the data confirm the hypothesis. Furthermore, as expected, IRDCs are located preferentially in a Milky Way spiral arm, the Crux-Scutum arm. One intriguing new clue about high-mass star formation is the extremely filamentary nature of IRDCs, some of which have aspect ratios of over 100 to 1. It is possible that all high-mass stars are formed in highly filamentary IRDCs due to the well-known "sausage" fluid instability in a cylindrical self-gravitating gas. If true, there are important consequences for theories of high-mass star formation.

Friday, April 24th, 1:30-2:30pm

Jennings Hall, Room 114

Light refreshments will be served. All are welcome!

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