
EXECUTIVE SUMMARY

EMPIRICAL ASSESSMENT OF COSMIC RAY PROPAGATION IN MAGNETISED MOLECULAR CLOUD COMPLEXES

ELLIS R OWEN, ALVINA Y L ON, SHIH-PING LAI, KINWAH WU

This poster introduces a method to empirically estimate the diffusion coefficient of cosmic rays propagating through molecular cloud complexes, using polarized optical and near infra-red observations. We apply this method to the IC 5146 Galactic molecular cloud complex, and use the resulting empirical diffusion coefficient to compute the distribution of cosmic rays and their impacts through the IC 5146 filaments. We find that cosmic rays can drive ionization in the dense filaments of this system, but their heating power is inconsequential.

We further consider the effect of cosmic ray irradiation levels that would be comparable to those inferred for nearby starburst galaxies. We conclude that cosmic rays could drive a strong heating power and significantly raise the Jeans' masses of filaments in the molecular cloud complexes of starburst galaxies, where they could moderate or suppress ongoing star-formation or distort the local stellar initial mass function.