1. Record Nr.   UNINA9910300435403321

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   Titolo   The Earliest Stages of Massive Clustered Star Formation: Fragmentation of Infrared Dark Clouds / / by Ke Wang

   Pubbl/distr/stampa Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2015

   ISBN   3-662-44969-2

   Edizione   [1st ed. 2015.]

   Descrizione fisica 1 online resource (160 p.)

   Collana   Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053

   Disciplina   523.88

   Soggetti   Observations, Astronomical
                      Astronomy—Observations
                      Atmospheric sciences
                      Microwaves
                      Optical engineering
                      Astronomy, Observations and Techniques
                      Atmospheric Sciences
                      Microwaves, RF and Optical Engineering

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Note generali   Description based upon print version of record.

   Nota di bibliografia   Includes bibliographical references at the end of each chapters.

   Nota di contenuto Scientific background -- An Infrared Point Source Survey -- The "Dragon" Nebula G28.34+0.06 -- The "Snake" Nebula G11.11–0.12 -- The Infrared Dark Cloud G30.88+0.13 -- A New Evolutionary Picture.

   Sommario/riassunto This thesis presents an in-depth, high-resolution observational study on the very beginning of the formation process: the fragmentation of dense molecular clouds known as infrared dark clouds (IRDCs). Using the Submillimeter Array (SMA) and Very Large Array (VLA) radio interferometers, the author has discovered a common picture of hierarchical fragmentation that challenges some of the leading theoretical models and suggests a new, observation-driven understanding of how massive star formation in clustered environments may begin: it is initiated by the hierarchical fragmentation of a dense filament from 10 pc down to 0.01 pc, and the stellar mass buildup is simultaneously fed by hierarchical accretion at

similar scales. The new scenario points out the importance of turbulence and filamentary structure, which are now receiving increasing attention and further tests from both observers and theorists.