PHYSICS AND ASTRONOMY
SEMINAR

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"The Migrating Embryo Model of Protostellar Disk Evolution"

Abstract

I review our work that establishes a new view of early protostellar disk evolution resulting from the self-consistent collapse of a prestellar core. A burst mode of accretion begins upon the formation of a centrifugally balanced disk around a newly formed protostar.

It is comprised of prolonged quiescent periods of low accretion rate that are punctuated by intense bursts of accretion that about three orders of magnitude greater, and during which most of the protostellar mass is accumulated.

The accretion bursts are associated with the formation of dense protostellar/protoplanetary embryos, which are later driven onto the protostar by the gravitational torques that occur in the disk.

We conclude that most (if not all) protostars undergo a burst mode of evolution during their early accretion history. I review how the migrating embryo model leads to a unified picture of episodic accretion, formation of companion stellar or substellar objects, and even ejection events to make free-floating giant planets or brown dwarfs. I also review how this paradigm is leading to new insights into thermal processing of solid materials in the early solar system and the evolution of the first collapsed structures in the universe.

Friday, November 20, 2015
10:30 a.m.
Engineering Computer Science Building
Room 130