*Triggered Star Formation in a Turbulent ISM*
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# Radiation driven implosion model for star formations near an H II region

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**Abstract.** We performed numerical simulation including UV radiation transfer, and investigated effects of radiation driven implosion on star formation processes. We also observed two bright-rimmed clouds with $C^{12}O$(J=1-0) and $C^{13}O$(J=1-0) in order to compare density distributions between numerical results and observational results. Density profiles of bright-rimmed clouds are consistent with those of numerical simulations. These facts insist that star formations in bright-rimmed clouds are triggered by radiation driven implosion.

**Keywords.** radiation driven implosion, bright-rimmed clouds

## 1. Introduction

Massive stars play very important roles in star formations in giant molecular clouds. Strong UV radiation of massive star ionizes surrounding gas, and creates an HII region. If pre-existing clouds are immersed by expanding HII region, then they are compressed owing to strong UV radiation. Triggered star formations due to Radiation Driven Implosion (hereafter, RDI) are suggested near HII regions (Bertoldi 1989).

Bright-rimmed clouds, which are found at the edge of relatively old HII regions, have cometary shapes. These shapes are explained well by RDI model. Bright-rimmed clouds are potential sites of triggered star formations due to RDI.

## 2. Method and results

We performed one dimensional and two dimensional numerical simulations. In one dimensional simulations, we assumed that a spherical core is immersed within an HII region and is exposed to diffuse radiation from surrounding ionized gas. We explored whether or not RDI enhance the accretion rate by orders of magnitude. Triggered star formations due to radiation-driven implosion increase accretion rates of protostars by 1-2 orders of magnitude compared with star formation without external trigger.

In two dimensional simulations, we assumed axisymmetry. A uniform spherical cloud is exposed to UV radiation. Our results show that the density profile is steeper at the side facing the ionized star than at the opposite side. We observed two bright-rimmed clouds and compared density profiles with those of the numerical simulation. Density profiles of bright-rimmed clouds are consistent with those of RDI model.

## Reference

Bertoldi, F. 1989, *ApJ* 346, 735