Different types of instability have been proposed to understand some features of the astrophysical objects or formation of the structures in the astrophysical flows. Rayleigh Taylor (RT) instability is an important mechanism which operates at the interface of two fluids with different densities while accelerating towards each other (Chandrasekhar1961). The RT instability has found applications in various astrophysical systems, such as expansion of the supernova remnants, bubbles in the interacluster medium, prominences in the solar atmosphere, interior of the red giant, bubbles around massive protostars, etc.

For example, the massive stars create radiation-driven bubble in accreting flows. This bubble may limit the upper mass of stars that can form by accretion. Indeed, simulations and analytic calculations to date have been unable to resolve the mystery of how stars of 50 M_sun and up form(M. R. Krumholz et al 2009). But this bubble is unstable and its growth helps to keep up accretion and so we can see the formation of heavier stars. Jacquet & Krumholz (2011) found that linear growth time-scale of RT instability is less than 1000 years which is quite short compared to the star formation time-scale which is approximately of order 10^ 5 years. Since we had studied the role of magnetic field on RT instability, we added the magnetic field to this radiative system. Our study on the growth of bubbles around massive protostars shows that magnetic field is able to suppress the instability and not only the clumps may form over a longer period of time but also their size significantly will depend on the strength of the magnetic field. In this seminar, I'm going to talk about RT instability and some astrophysical systems that we've studied them.