Contribution ID: **3** Type: **Contributed talk**

The effect of dust cooling in the fragmentation of star-forming clouds for the transition from Pop. III to Pop. II

Wednesday 10 November 2010 14:20 (20 minutes)

The first burst of star formation in the Universe is thought to give rise to 'massive' stars, with current theory predicting masses in the range 20-150 solar masses. This contrasts with the mode of star formation we see today, which tends to yield stars with masses less than 1 solar mass, and so at some point in the evolution of the Universe there was a transition from primordial (POP III) star formation to that the star formation we see today (POP II/I). The most widely accepted cause for this transition is metal enrichment in the interstellar medium by the previous generations of stars, and suggests that there may a 'critical metallicity' at which the mode of star formation
changes.
We investigate the effects of the cooling due to dust grains on the collapse of low metallicity star forming clouds and the Pop III/II transition. Making use of 3D numerical models to follow the thermal
evolution of clouds with different metallicities, we study self-consistently the evolution of the gas and dust temperatures during the collapse, and determine the properties of the cloud at
the point at which it undergoes gravitational fragmentation. This allows us to investigate the role that dust cooling may play in the transition from a Pop. III IMF composed predominantly of high-mass stars to the IMF we observe today.

Primary author: Mr DOPCKE, Gustavo (ITA - Universität Heidelberg)

Co-authors: Dr CLARK, Paul (ITA - Heidelberg); Prof. KLESSEN, Ralf (ITA - Heidelberg); Dr GLOVER, Simon (ITA - Heidelberg)

Presenter: Mr DOPCKE, Gustavo (ITA - Universität Heidelberg)

Session Classification: Session 3

Track Classification: Early stars