Contribution ID: **14** Type: **not specified**

Gamma-Ray Bursts as the missing link in stellar evolution RIMANDATO a nuova data

Thursday, 20 March 2014 15:00 (1 hour)

The first stars of the Universe, called Population III stars (Pop III), are rapidly becoming an important subject of investigation from the point of view of theory and observations. The formation of these stars hundreds of millions years after the Big-Bang marks the end of what it is called the "Dark Age"". Today's telescopes cannot look far enough into the cosmic past, so we don't have direct observations on how the primordial stars were formed. This new window is of paramount importance to astrophysics and cosmology. Population III stars are formed with primordial nucleosynthesis elements, they are responsible for the formation of the first metals in the Universe. Change of chemical composition also affects the Initial Mass Function of stars. The energy scattered in newborn Universe will drastically influence its history. Certainly, the new generation of instruments will give us an opportunity to test theoretical ideas about formation of the first stars.
Among these first generation stars an important role were played buy massive stars. The Jean Mass favors creation of very massive objects during star formation by condensation of nuclear cloud. Numerical simulations predict that Pop III stars could have masses as high as few hundreds solar masses. As these stars evolve, physical conditions in the center lead to the development of specific type of hydrostatic instability through electron-positron pairs creation (pair-instability).
In this presentation, I will re-analyse Pair Instability (PI) SN explosion. I will present results of one-dimensional simulations and analysis of the fate of a star depending on physical conditions. I will also present 2D simulations of PISN explosion based on idea of non-uniform explosion and compare the results with the case of uniform explosion in stellar core. I will explore a new scenario of Gamma-Ray Bursts related to the PISNe and present some interesting consequences.

Presenter: Prof. CHARDONNET, Pascal (Université de Savoie, Annecy (Francia))