Contribution ID: **20** Type: **Contributed talk**

The effects of accretion luminosity from Pop III protostars

Wednesday 10 November 2010 16:00 (20 minutes)

While the first stars were long thought to form as isolated, single objects, recent cutting-edge simulations have shown that multiple sites of fragmentation can be formed even in primordial halos. These new results have important consequences for our understanding of the early Universe, and the observational signatures that might be expected from the first stars and protogalaxies. It is therefore important to study this fragmentation in detail, and assess the extent to which it may be suppressed by protostellar feedback. In this contribution, we will discuss the effects of the accretion luminosity from young protostars on their immediate environment. Firstly, we shall show that while the accretion luminosity heats the accretion disk surrounding the first protostar, such radiative feedback is unable to fully stabilise the disk against gravitational instability. Consequently, the disk still fragments, forming a binary or higher-order multiple system. Secondly, we shall discuss the effects of feedback on a small cluster of stars forming in primordial conditions. In particular, we will address whether feedback can reduce or stop fragmentation, and what influence it has on the accretion rates of the young protostars.

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Session Classification: Session 4

Track Classification: Early stars