ICTS Seminar

Title : Looking for Primordial Black Holes in the CMB

Speaker : Vivian Poulin, John Hopkins University, USA

Date : Thursday, July 12, 2018

Time : 2:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Searches for Primordial Black Holes (PBH) as part -or all- of the Dark Matter (DM) has regained a vigorous interest since the discovery by aLIGO/Virgo of several BH mergers with relatively high masses ~ O(30 Msun). However, the mass range spanned by PBH as DM is much broader, extending from ~ 10^15g to thousands of solar masses depending on the formation model. In this talk, I would like to review how the CMB (in particular its temperature and polarization anisotropies) can be used to probe the existence of PBH in our Universe. In a first part, I will focus on light PBH, whose masses are in the range ~[10^13;10^17g]. Such BH are believed to experience Hawking evaporation, a process that leads to the emission of energetic particles with blackbody spectra able to affect the CMB. In a second part, I will discuss the other end of the mass spectrum, for which effect of matter accretion around the BH is responsible for the emission of X-ray photons having a similar effect on the CMB. I will compare these bounds with other relevant bounds (micro-lensing, merger rate, galactic cosmic rays and photons…) and illustrate how the 21cm signal could help us in probing these models further, even though the possibility that they may contribute to a high fraction of the DM has faded away.