Primordial black holes and second order gravitational waves from inflationary α-attractor models RAFID MAHBUB, University of Minnesota — I will talk about primordial black hole (PBH) formation using a type of inflection-point potential derived using the inflationary α-attractor model. The inflection plateau region gives rise to a phase called ultra slow-roll (USR) where the curvature power spectrum $\mathcal{P}_\zeta$ is amplified upto 10^{-3} and 10^{-2} which produces the right conditions for PBH formation. The curvature perturbation modes that collapse to form PBHs are approximately $k \sim 10^{14} Mpc^{-1}$, giving rise to PBHs in the mass range 10^{16} to $10^{18}g$ which can be cosmologically relevant as a cold dark matter (CDM) candidate. The abundance of PBHs is derived using a modification of the Press-Schechter theory which takes into account the intrinsic non-Gaussianity of the overdensity perturbations $\delta\rho/\rho$. I will present the results with the nonvanishing skewness and kurtosis of the distribution of $\delta\rho/\rho$ and show that this α-attractor inflationary model can produce PBHs that can comprise a cosmologically significant proportion of CDM. We will also see that second order gravitational waves can be produced from this model in the frequency range 10^{-2} to $10^2 Hz$ at levels which can potentially be detected in the future.

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