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Recycled Dark Matter

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Studying the early universe provides possible answers to many open questions such as the origin and composition of dark matter. Primordial black holes (PBHs) are a compelling channel to probe and understand the cosmic history of dark matter. Light PBHs, which have Hawking evaporate before BBN, can produce both Standard Model particles and dark matter via gravitational production. In this talk I will discuss how our model of multi component dark matter consisting of a heavy scalar and heavy fermion forms PBHs during a first order phase transition. Our scenario demonstrates the dark matter relic abundance can be reproduce even if the pre-Black hole relic abundance is negligible by Hawking evaporating, i.e the recycling mechanism. PBHs formation during a first order phase transition can create stochastic gravitational waves in the high frequency regime which is a possible detection method.

Authors: SHAMS ES HAGHI, Barmak (University of Texas at Austin); SINHA, Kuver (University of Oklahoma); XU, Tao (The University of Oklahoma); GEHRMAN, Thomas (University of Oklahoma)

Presenter: GEHRMAN, Thomas (University of Oklahoma)

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