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Dark Matter ≡ PIMBHs

Primordial Intermediate-Mass Black Holes

The thinking which led to this dark matter solution traces back to reading Tolman's *Relativity, Thermodynamics and Cosmology* as a final year undergraduate in 1965 and a life-long interest in the entropy of the universe. In 2007, with my student Baum, we proposed a cyclic cosmology model which overcomes Tolman's no-go theorem. The entropy of the universe and second law of thermodynamics suggest that many more black holes exist than have been observed. To be dark matter they must be primordial because of the constraint imposed by the baryon number of the universe. In 2010 we showed how primordial black holes could be formed at arbitrarily high masses. In 2015, these considerations together with the failure to find supersymmetry or WIMPs led to a seemingly unique solution [1] for dark matter, that DM ≡ PIMBHs. This theory is best tested by microlensing of stars in the Magellanic Clouds and a new microlensing experiment is underway using the Blanco 4m telescope at Cerro Tololo in Northern Chile. Re-analysis of an old experiment at Mount Stromlo in Australia has provided encouraging preliminary results. A general discussion of the motivations for DM ≡ PIMBHs is provided in [2].

References

[1] P.H. Frampton, Mod. Phys. Lett. **A31,** 1650093 (2016).

[2] P.H. Frampton, Int.J.Mod.Phys. **A33,** 1830030 (2018).