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Black Holes from Atomic Dark Matter

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Dissipative dark matter models, a relatively new solution to the dark matter problem, have been suggested to form black holes with a novel mass spectrum in an analogous way to Population III star formation. We present here our efforts to verify this analytic prediction using an "atomic" dark matter model, with microphysics that we have extended into the molecular regime, and utilized, as part of an expansion to the KROME astrochemical software package, in a simple halo collapse scenario. Our results demonstrate the necessity of including molecular chemistry in this model for dark black hole formation, as well as the need for further semi-analytic and eventually full numerical simulations to compare with constraints coming from gravitational wave observatories.

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