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Explaining the cosmological dark matter coincidence in asymmetric dark QCD

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Observations have established that the dark matter mass density is about five times that of ordinary matter, rather than being orders of magnitude different. This coincidence is potentially explained by asymmetric dark matter. In almost all such models, however, while the number density asymmetries of ordinary and dark matter are related, the mass of the dark matter particle is left as a free parameter. That means the coincidence is not explained. I discuss an approach to justifying why the dark matter mass scale is related to the proton mass that uses an infrared fixed point in the renormalisation group evolution of the ordinary and dark QCD coupling constants. The dark matter particle is a stable baryon of dark QCD, just as the proton is a stable baryon of ordinary QCD.

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