

# Phenomenology 2022 Symposium: From Virtual to Real



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## Asymmetric Dark Matter May Not Be Light

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It is often said that asymmetric dark matter is light compared to typical weakly interacting massive particles. Here we point out a simple scheme with a neutrino portal and  $\mathcal{O}(60 \text{ GeV})$  asymmetric dark matter which may be “added” to any standard  $\text{electroweak}$  baryogenesis scenario. The dark sector contains a copy of the Standard Model gauge group, as well as (at least) one matter family, Higgs, and right-handed neutrino. After baryogenesis, some lepton asymmetry is transferred to the dark sector through the neutrino portal where dark sphalerons convert it into a dark baryon asymmetry. Dark hadrons form asymmetric dark matter and may be directly detected due to the vector portal. Surprisingly, even dark anti-neutrons may be directly detected if they have a sizeable electric dipole moment. The dark photons visibly decay at current and future experiments which probe complementary parameter space to dark matter direct detection searches. Exotic Higgs decays are excellent signals at future  $e^+e^-$  Higgs factories.

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