

# Phenomenology 2022 Symposium: From Virtual to Real



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## Super-Resonant Dark Matter

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In this paper we present *Super-Resonant Dark Matter* (SRDM), a model of self-interacting dark matter (SIDM) based on the low energy effective theory of supersymmetric QCD. A novel feature of the model is that an s-channel resonance is generated in the non-relativistic limit via a mass ratio fixed by flavor symmetry. One loop corrections shift the mass ratio off resonance and allow SRDM to accommodate small scale anomalies seen in dark matter halos. Fitting to dark matter halo observations also picks out a precise dark matter mass range ( $m_{DM} \sim 4\text{--}8$  MeV) and self interaction coupling; something which is not achieved for many SIDM models with resonant self interactions. The SRDM model can account for all of the dark matter in the universe if it is produced via the freeze-in mechanism with a U(1)<sub>D</sub> massive dark photon acting as the mediator between the dark sector and the Standard Model (SM). The ease of detection of the dark matter depends on the U(1)<sub>D</sub> gauge coupling, which in turn determines the annihilation of charged dark matter to neutral dark matter.

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