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Viable dark matter via radiative symmetry breaking in a Higgs portal extension of the standard model[1] ZHI-WEI WANG, TOM STEELE, University of Saskatchewan, ROBB MANN, DAGOBERTO CONTRERAS, University of Waterloo — We consider generation of dark matter mass via radiative electroweak symmetry breaking in an extension of the conformal Standard Model containing a singlet scalar field with a Higgs portal interaction. Generating the mass from a sequential process of radiative electroweak symmetry breaking followed by a conventional Higgs mechanism can account for less than 30% of the cosmological dark matter abundance. However in a dynamical approach where both Higgs and scalar singlet masses are generated via radiative electroweak symmetry breaking we obtain much higher levels of dark matter abundance: 10%–80% for a dark matter mass of $80\,\mathrm{GeV} < M_s < 96\,\mathrm{GeV}$ when higher-order contributions are estimated. The dynamical approach also predicts a small scalar-singlet self-coupling, providing a natural explanation for the astrophysical observations that place upper bounds on dark matter self-interaction. The predictions in both methods are within the detection region of the next generation XENON experiment.

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Thomas Steele
University of Saskatchewan

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