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Chiral Lattice Gauge Theories and the Strong Coupling Dynamics of a Yukawa-Higgs Model with Ginsparg-Wilson Fermions[1] JOEL GIEDT, Dept. of Physics, Rensselaer Polytechnic Institute, ERICH POPPITZ, Dept. of Physics, University of Toronto, Canada — The Yukawa-Higgs/Ginsparg-Wilson-fermion construction of chiral lattice gauge theories described in hep-lat/0605003 uses exact lattice chirality to decouple the massless chiral fermions from a mirror sector, whose strong dynamics is conjectured to give cutoff-scale mass to the mirror fermions without breaking the chiral gauge symmetry. In this talk, we report on our study of the mirror sector dynamics of a two-dimensional chiral gauge theory in the limit of strong Yukawa and vanishing gauge couplings, in which case it reduces to an XY model coupled to Ginsparg-Wilson fermions. For the mirror fermions to acquire cutoff-scale mass it is believed to be important that the XY model remain in its "high temperature" phase, where there is no algebraic ordering—a conjecture supported by the results of our work. We use analytic and Monte-Carlo methods with dynamical fermions to study the scalar and fermion susceptibilities, and the mirror fermion spectrum. Our results provide convincing evidence that the strong dynamics does not "break" the chiral symmetry (more precisely, that the mirror fermions do not induce algebraic ordering in two-dimensions), and that the mirror fermions decouple from the infrared physics.

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