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## Higgs Portal to Dark Vector Physics

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The quantum field theories of the Higgs boson interacting with light vector particles offer a number of non-trivial features to study. Bound states, phase structure, dynamical mass generation, and the Higgs mechanism are among them. As light vector particles are dark matter candidates, a thorough understanding of the involved physics is crucial as experimental searches continue. It requires methods beyond perturbation theory to capture all aspects of the new physics. We have used the lattice simulation method to study a model containing a real  $U(1)$  (gauge symmetry) breaking vector field and a  $SU(2)$  preserving complex doublet field in terms of different correlation functions and the bound state masses.

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