

Abstract Submitted  
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**An apparatus for simulating lattice spin models with Rydberg-dressed cesium atoms**<sup>1</sup> OGNJEN MARKOVIC, VICTORIA BORISH, JACOB HINES, MONIKA SCHLEIER-SMITH, Stanford University — Rydberg-dressed atoms provide a versatile platform for engineering lattice spin models for studies of frustrated magnetism and quantum many-body dynamics. We present the design of an experiment that is optimized for achieving highly coherent and dynamically controllable interactions. Cesium atoms will be pinned in a two-dimensional optical lattice of 1-2  $\mu\text{m}$  spacing and coupled to the Rydberg manifold with a single ultraviolet photon. A flexible experimental chamber design will permit close optical access for trapping, imaging and addressing, while simultaneously enabling control of the electric field to enhance the strength of interactions or switch their sign. The large interatomic spacing will facilitate single-spin-resolved detection for detailed characterization of many-body quantum states.

<sup>1</sup>ARO

Ognjen Markovic  
Stanford University

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