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Simulations of the angular dependence of the dipole-dipole interaction among Rydberg atoms JACOB L. BIGELOW, JACOB HOLLINGSWORTH, JACOB T. PAUL, MATAN PELEG, VERONICA L. SANFORD, THOMAS J. CARROLL, Ursinus College, MICHAEL W. NOEL, Bryn Mawr College — The dipole-dipole interaction between two Rydberg atoms depends on the relative orientation of the atoms and on the change in the magnetic quantum number. We simulate the effect of this anisotropy on the energy transport in an amorphous many atom system of ultracold Rydberg atoms subject to a homogeneous applied electric field. We consider two experimentally feasible geometries and find that the effects should be measurable in current generation imaging experiments. We also examine evidence for Anderson localization. This work was supported by the National Science Foundation under Grants No. 1205895 and No. 1205897 and used the Extreme Science and Engineering Discovery Environment (XSEDE), which is supported by National Science Foundation grant number OCI-1053575.

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