Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Using geoelectrons to search for velocity-dependent spin-spin interactions LARRY HUNTER, DANIEL ANG, Amherst College — We use the recently developed model of the electron spins within the Earth to investigate all of the six possible long-range velocity-dependent spin-spin interactions associated with the exchange of an intermediate vector boson.[1] Several laboratory experiments have established upper limits on the energy associated with various spin orientations relative to the Earth.[2,3,4] We combine the results from three of these experiments with the Earth-spin model to obtain bounds on the velocity-dependent interactions that couple electron spin to the spins of electrons, neutrons and protons. Five of the six possible potentials investigated were previously unbounded. The bound achieved on V_8 is about 30 orders of magnitude more restrictive in the long-range limit than the only previously established constraint.[5]

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Date submitted: 29 Jan 2013 Electronic form version 1.4