Dressed Helium Comagnetometry for the Neutron EDM Experiment

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NEUTRON EDM COLLABORATION — The electric dipole moment (EDM) of
the neutron provides a unique window into CP-violating processes in the light-quark
baryon sector. A new experiment with ultracold neutrons aims to measure the neu-
tron EDM with a sensitivity of $10^{-27}$ e-cm. The experiment will use a novel direct
comagnetometry technique with polarized $^3$He “dressed” by a RF magnetic field, to
match its effective magnetic moment to that of the neutron. This method allows a
sensitive measurement of the neutron precession rate relative to the $^3$He. We have
studied the dressed $^3$He spin system experimentally using a polarized $^3$He source at
Los Alamos. Results of this first measurement of spin dressing effects on the $^3$He
magnetic moment will be presented.

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