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Spin-exchange and spin-relaxation in ultracold Rb-Sr^+ collisions MASATO MORITA, Univ of Nevada - Reno, TOMAS SIKORSKY, ZIV MEIR, Weizmann Institute of Science, Rehovot, Israel, ALEXEI BUCHACHENKO, Skolkovo Institute of Science and Technology, Moscow, Russia, RUTI BEN-SHLOMI, NITZAN AKERMAN, EDVARDAS NAREVICIUS , Weizmann Institute of Science, Rehovot, Israel, TIMUR V. TSCHERBUL, Univ of Nevada - Reno, ROEE OZERI , Weizmann Institute of Science, Rehovot, Israel — We present a joint experimental and theoretical study of collision-induced spin exchange and spin relaxation of a single trapped Sr^+ ion immersed in an ultracold gas of Rb atoms in different hyperfine states. We find that inelastic spin-relaxation of Sr^+ caused by the second-order spin-orbit coupling occurs much more slowly than in Rb-Yb^+ collisions. The calculated spin exchange rates are very sensitive to small variations of the Rb-Sr^+ interaction potential even in the multiple-partial-wave regime due to an unexpected correlation between the singlet and triplet scattering phase shifts.

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