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**Neutron-Mirror Neutron Oscillations in a Residual Gas Environment** LOUIS VARRIANO, YURI KAMYSHKOV, University of Tennessee, Knoxville — A precise measurement of the neutron lifetime is important for calculating the rate at which nucleosynthesis occurred after the Big Bang. The history of neutron lifetime measurements has demonstrated impressive continuous improvement in experimental technique and in accuracy. However, two most precise recent measurements performed by different techniques differ by about 3 standard deviations. This difference of 9.2 seconds can possibly be resolved by future experiments, but it may also be evidence of a mirror matter effect present in these experiments. Both mirror matter, a candidate for dark matter, and ordinary matter can have similar properties and self-interactions but will interact only gravitationally with each other, in accordance with observational evidence of dark matter. Three separate experiments have been performed in the last decade to detect the possibility of neutron-mirror neutron oscillations. This work provides a formalism for understanding the interaction of the residual gas in an experiment with ultra-cold neutrons. This residual gas effect was previously considered negligible but can have a significant impact on the probability of neutron-mirror neutron transition.

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