Abstract Submitted for the SES15 Meeting of The American Physical Society

Neutron-mirror neutron oscillations in a residual gas environment LOUIS VARRIANO, Univ of Tennessee, Knoxville, BORIS KERBIKOV, ITEP, Moscow, YURI KAMYSHKOV, Univ of Tennessee, Knoxville — 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. Although mirror matter does not couple to ordinary matter by Standard Model interactions, some additional interactions might exist, providing small mixing of ordinary matter neutral states, like the neutron, with mirror components. Three separate experiments have been performed in the last decade to detect the possibility of neutron-mirror neutron oscillations. In the analysis of the data of these experiments, the effect of the presence of residual gas (due to an imperfect vacuum) was not considered. This work provides a formalism for understanding the interaction of the residual gas in an experiment with ultra-cold neutrons. This residual gas effect that was previously considered as negligible can have a significant impact on the probability of neutron to mirror neutron transformation. This formalism is used to evaluate the three previous experiments and can provide a framework for the future mirror matter search experiments.

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Date submitted: 16 Oct 2015

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