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Cold atoms in one-dimensional rings: a Luttinger liquid approach to precision measurement.¹ STEPHEN RAGOLE, JQI, QuICS, and University of Maryland, JACOB TAYLOR, JQI, QuICS, University of Maryland, and National Institute of Standards and Technology — Recent experiments have realized ring shaped traps for ultracold atoms. We consider the one-dimensional limit of these ring systems with a moving weak barrier, such as a blue-detuned laser beam. In this limit, we employ Luttinger liquid theory and find an analogy with the superconducting charge qubit. In particular, we find that strongly-interacting atoms in such a system could be used for precision rotation sensing. We compare the performance of this new sensor to the state of the art non-interacting atom interferometry.

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